

STANDARDS DEVELOPMENT BRANCH OMOE

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STRUCTURAL PEST IDENTIFICATION

**SB
931
.M66**
MOE

**Ministry
of the
Environment**

**Pesticides Control
Service**

Hon. Keith C. Norton, Q.C.,
Minister

Graham W. S. Scott, Q.C.,
Deputy Minister

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SB
931
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STRUCTURAL PEST IDENTIFICATION

Illustrations, descriptions, life cycle
and habits of common household pests.

Compiled and illustrated by

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District Pesticides Officer
Pesticides Control Service
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MINISTRY OF THE ENVIRONMENT

Hon. George A. Kerr, Q.C.

Everett Biggs, Deputy Minister

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A C K N O W L E D G M E N T

I wish to acknowledge with great appreciation the valuable assistance and critical review of this booklet by the following persons: Mr. W. L. Smith, Chief, Pesticides Control Service, Ontario Ministry of the Environment and Mr. Harold W. Goble, BSA, MSc, Provincial Entomologist, Professor of Entomology, University of Guelph.

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Ministry of the Environment

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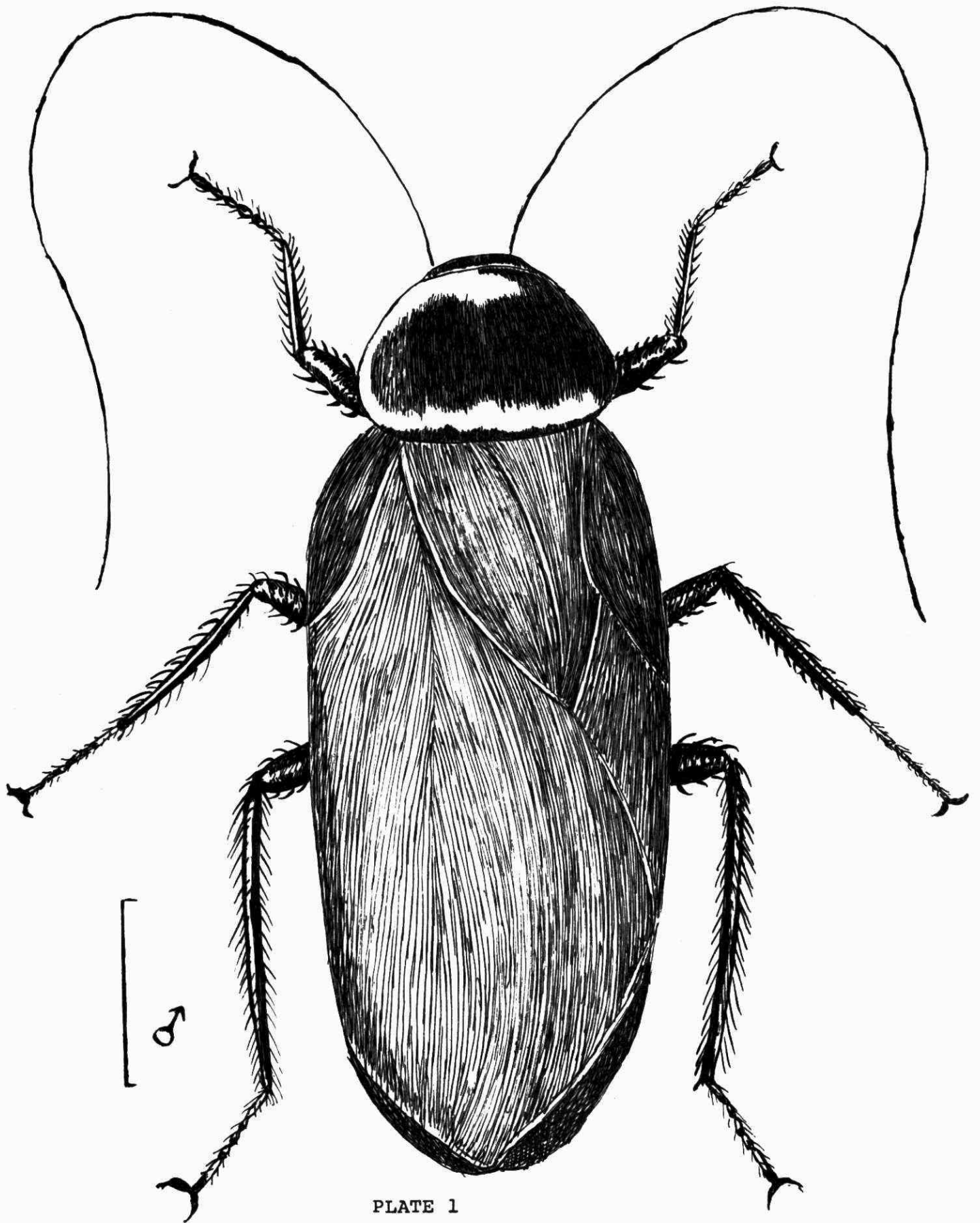


PLATE 1

AMERICAN COCKROACH

RKM.28/9/72

AMERICAN COCKROACH
Periplaneta americana

Common Names: american cockroach, water bug

Size: Adults $1\frac{1}{2}$ inches long - largest roach
nymphs have 13 instars, increasing in size at each moult

Appearance: - reddish brown with light markings on thorax
- fully developed wings
- wings of male adult extend from 4 to 8 mm over end of abdomen
- female adults wings are usually equal to or slightly longer than abdomen
- wing pads become evident in 3rd or 4th instar
- adults can fly

Life Cycle: - metamorphosis incomplete
- egg capsule contains 16 eggs - 8 in each row
- female lays 6 to 14 capsules and stores in dark crevices or buries them
- incubation period 38 to 49 days
- nymph requires 13 instars to reach maturity approximately 450 days

Habits: - Southern United States and Mexico origin, has spread to all parts of North America
- found in basements, sewage systems, ships, and all areas where food is stored or prepared
- attacks a wide variety of foods

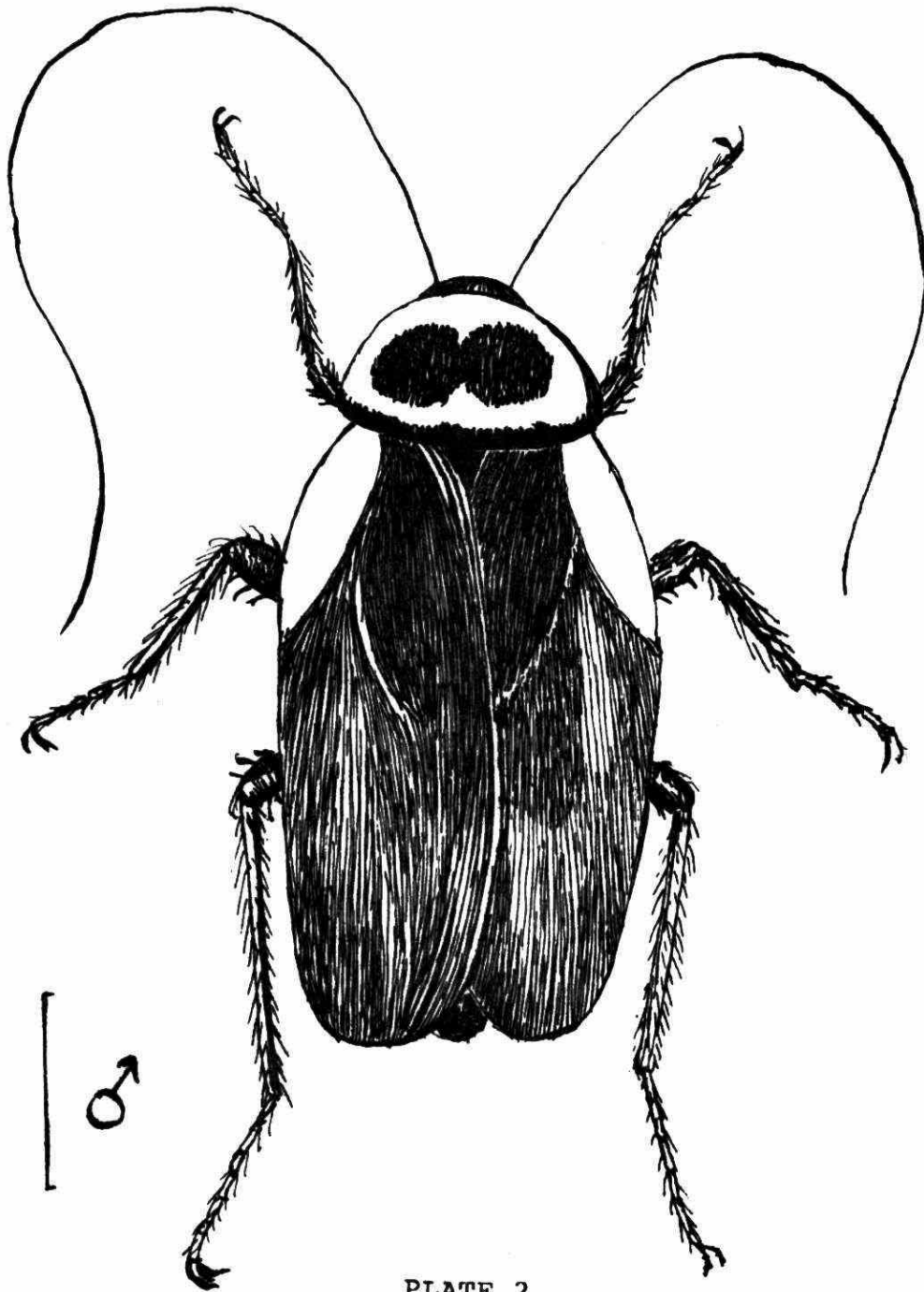


PLATE 2

AUSTRALIAN COCKROACH

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AUSTRALIAN COCKROACH
Periplaneta australasiae

Common Name: Australian cockroach

Size: Adults 1 inch

nymph has 9 instars increasing in size at each moult

Appearance: - light brown with yellow margin on thorax and light
yellow streaks on the sides at the base of wing cover
- dark spot at centre of pronotum

Life Cycle: - metamorphosis incomplete
- number of eggs in capsule averages 24
- incubation period about 40 days
- life cycle about 9 months

Habits: - this species is world wide
- often inhabits greenhouses and appears to be more
vegetarian than other roaches but will invade homes
where it may eat holes in clothing and feed on
book covers

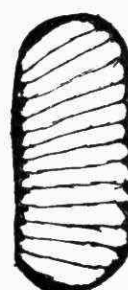
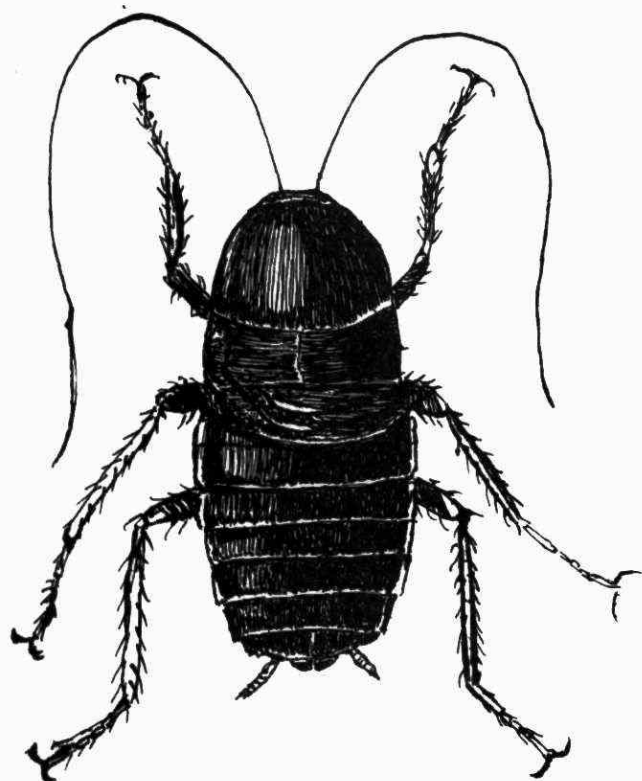
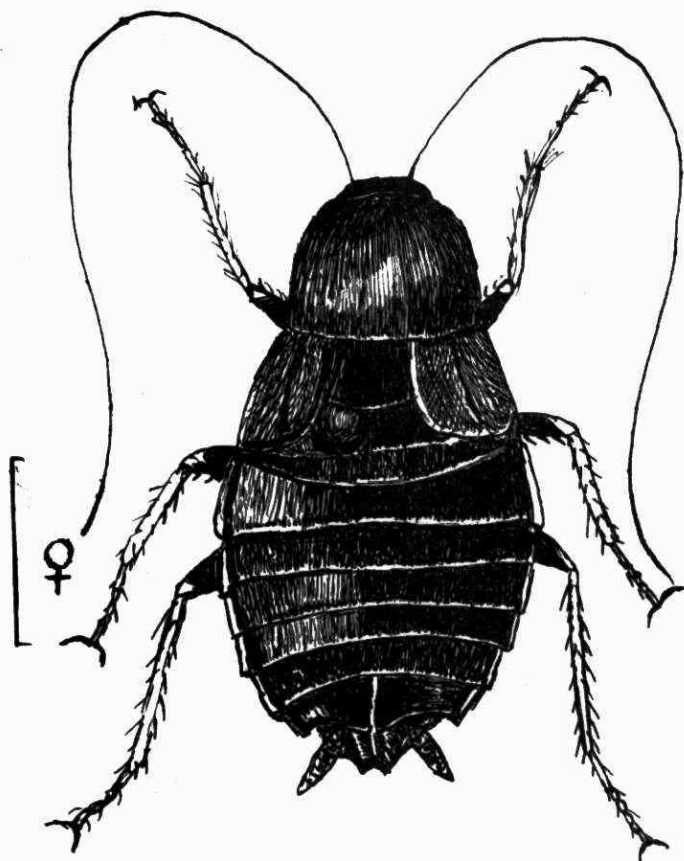
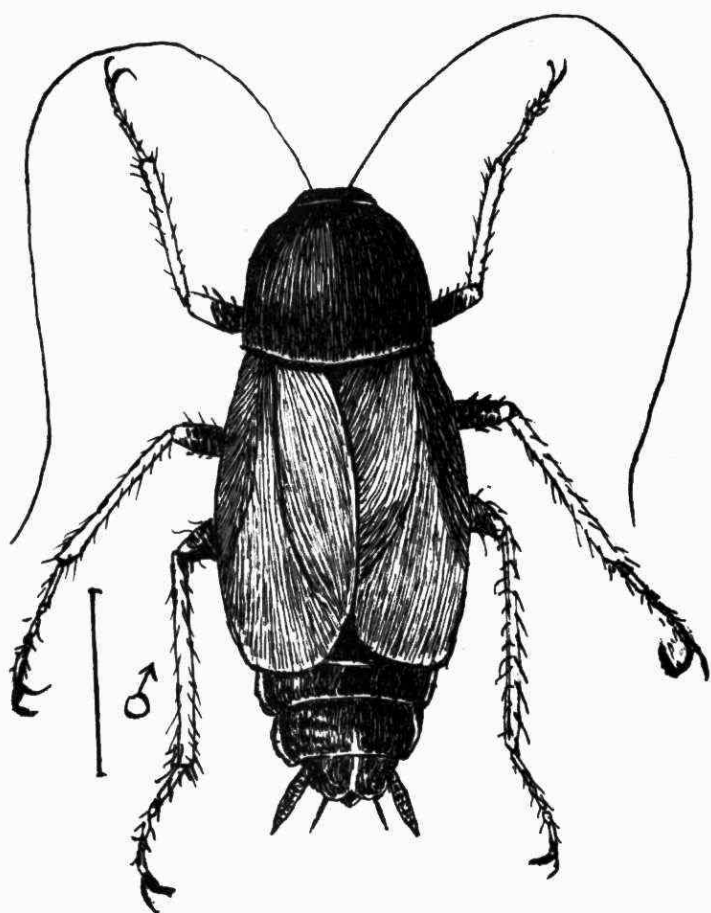


PLATE 3

ORIENTAL COCKROACH

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ORIENTAL COCKROACH
Blatta orientalis

Common Names: oriental cockroach, water bug, black beetle

Size: Adult, 1 inch
nymphs have 7 instars increasing in size at each moult

Appearance: - very dark brown, appearing black
- males have fully developed wings but do not extend to cover abdomen
- females have rudimentary wings that are reduced to mere lobes
- cannot fly

Life Cycle: - metamorphosis incomplete
- females lay capsules $\frac{1}{2}$ inch long and $\frac{1}{4}$ inch broad
- capsule contains 16 eggs (8 in each row)
- female is able to lay a maximum of nine capsules
- incubation period from 42 to 81 days (60 day average)
- life cycle averages 13 months

Habits: - oriental in origin, it has become world wide
- prefers dark damp areas in basement, etc., but will forage for food in upper floors
- destroys and contaminates a wide range of food products in all life stages.

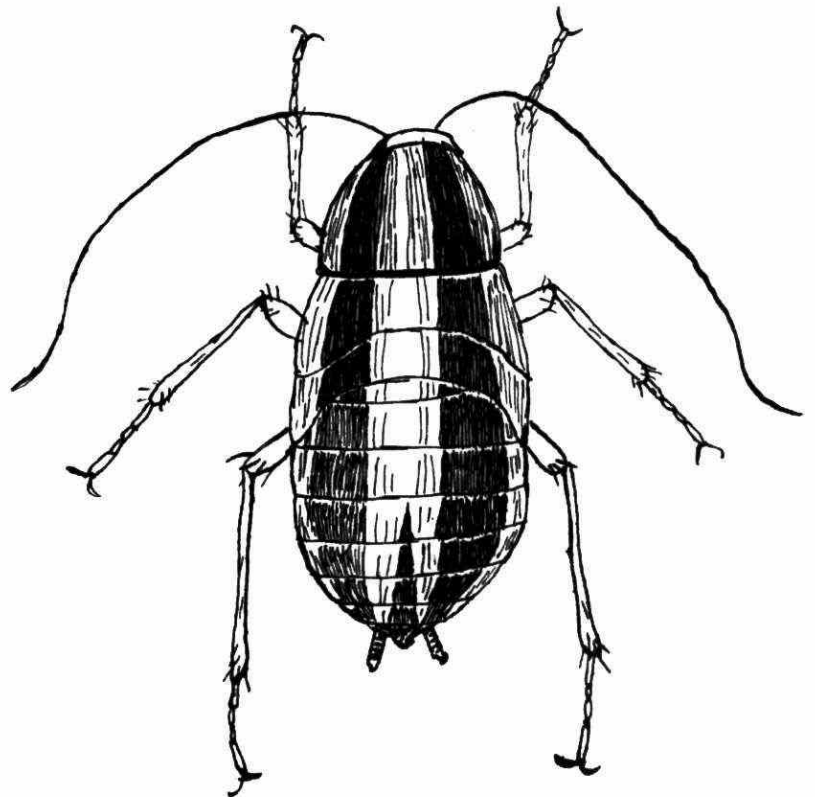
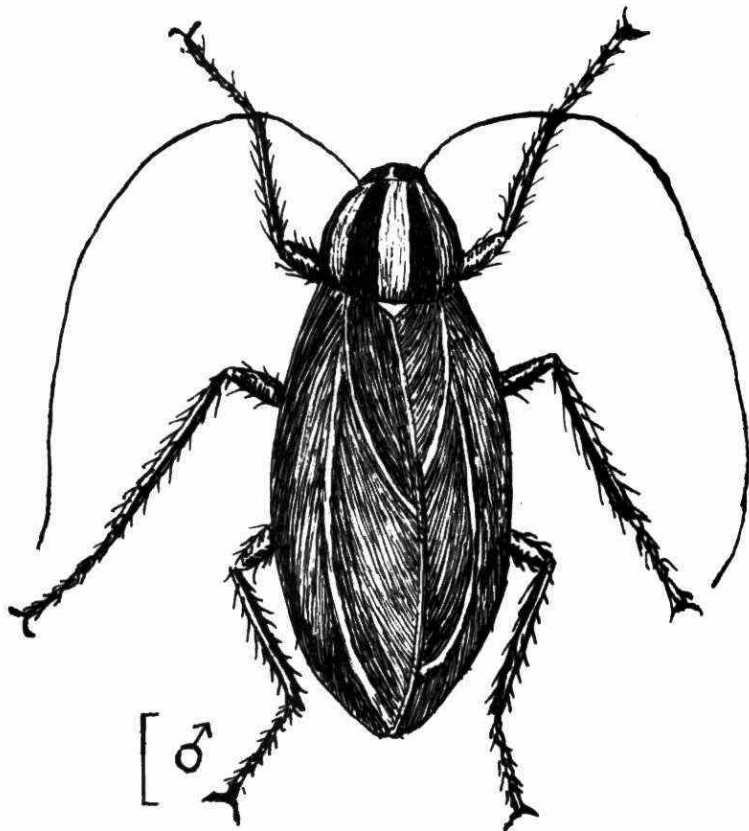


PLATE 4
GERMAN COCKROACH

GERMAN COCKROACH
Blattella germanica

Common Names: german cockroach, steam fly, shiner, croton bug

Size: Adults, $\frac{1}{2}$ inch (approximately)
nymph has 7 instars increasing in size with each moult

Appearance: - yellowish brown with two dark brown longitudinal bands on the prothorax
- female slightly larger and broader than the male
- adults have fully developed wings

Life Cycle: - metamorphosis incomplete
- eggs are laid in glossy brown rectangular capsule
- capsule is $\frac{1}{4}$ inch long and $\frac{1}{8}$ inch broad
- capsule contains 20 to 40 eggs
- female lays up to 7 capsules
- this species is a small roach
- incubation period - 14 days
- nymphal stage 60 to 65 days
- Life cycle 2 to 5 months
- 2 or 3 generations a year

Habits: - this species is world wide
- found in homes, restaurants and ships
- likes moist warm places
- nymph and adult attack a wide variety of foods

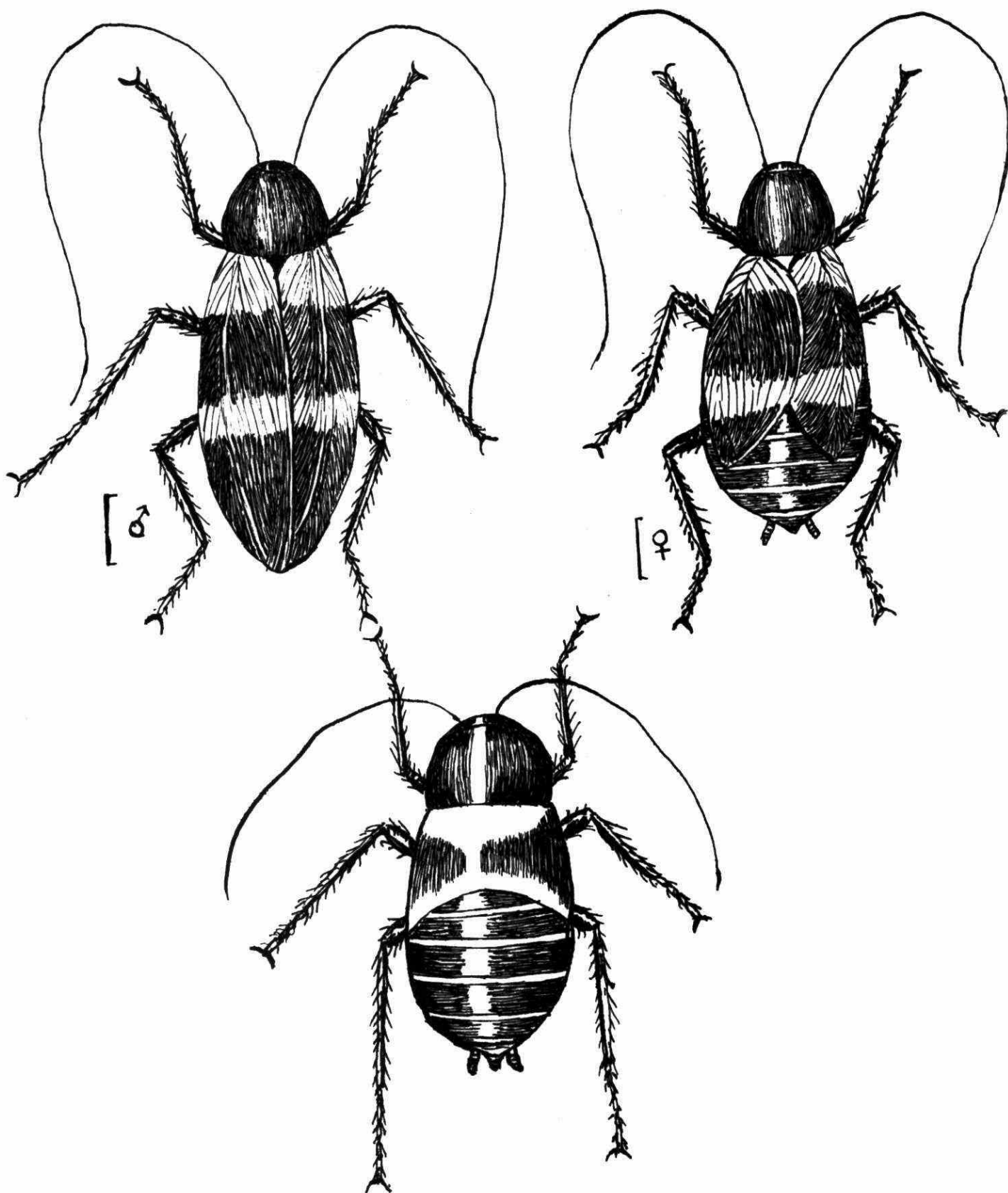


PLATE 5

BROWN BANDED COCKROACH

BROWNBANDED COCKROACH
Supella longipalpa

Common Names: brownbanded, spotted, tropical

Size: Adult about $\frac{1}{2}$ inch - smallest roach
nymph has 7 instars increasing in size with each moult

Appearance: - black to pale golden in colour
- wings twice banded with brownish yellow stripes
- wings of male extend over end of abdomen
- wings of female extend to $\frac{3}{4}$ length of abdomen
- lacks two dark strips on thorax
- very active and fly readily.

Life Cycle: - metamorphosis incomplete
- egg capsule is yellowish or reddish brown
- egg is $\frac{3}{16}$ inch long
- maximum eggs in capsule 18
- female attaches egg capsule to some object
- incubation period averages 69 days
- average development 161 days

Habits: - African origin, is now prominent in Canada and U.S.
- prefers high dark crevices in homes, such as shelves,
cupboards, behind pictures, etc.
- attacks a wide variety of foods

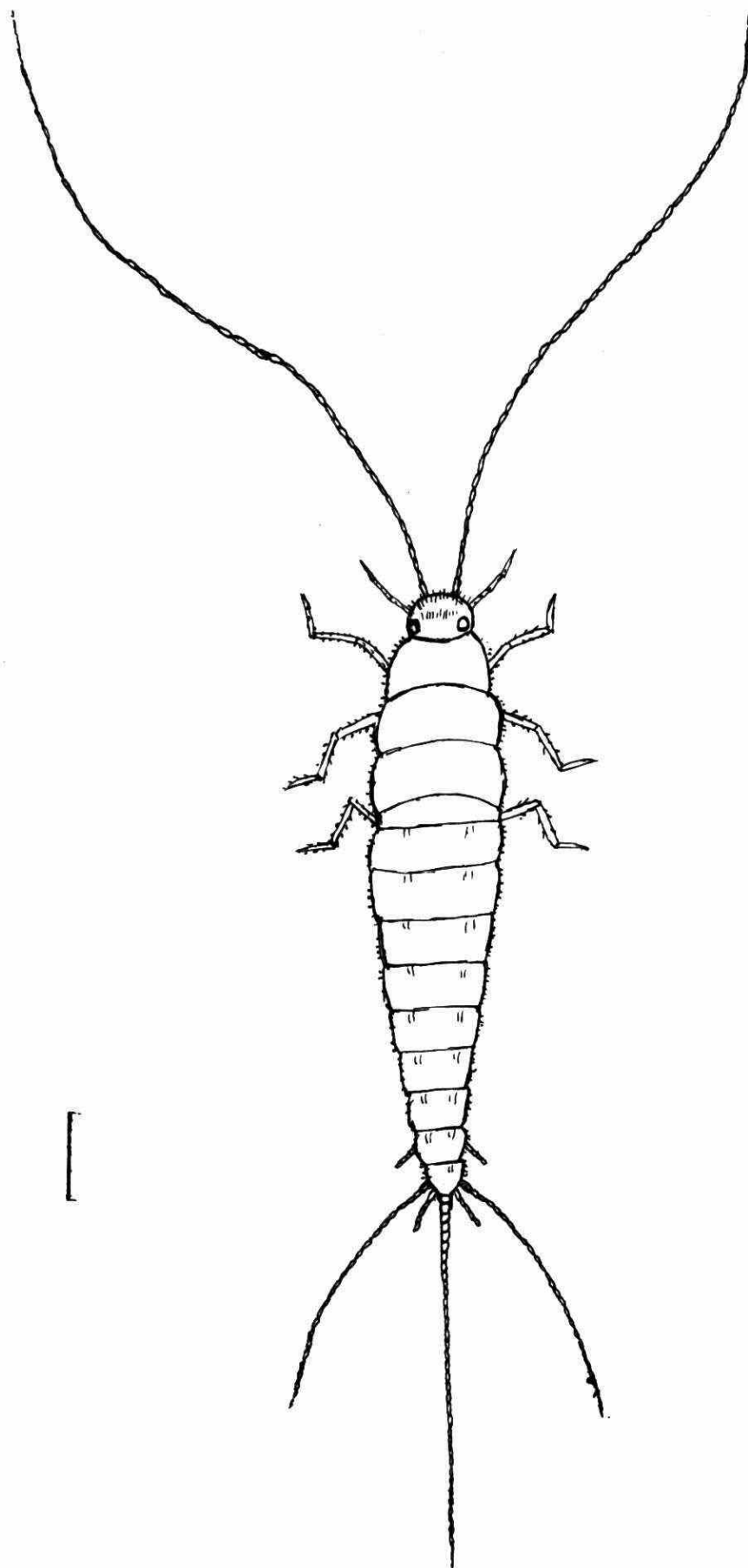


PLATE 6

SILVERFISH

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SILVERFISH
Lipisma saccharina

Common Names: silverfish, bristle tail, slicker

Size: Adult, $\frac{1}{2}$ inch long
nymph has continuous instars through life, 45 to 60

Appearance: - silvery colour
- scale covered
- wingless
- 2 long antenna
- short legs
- 3 long bristles at end of abdomen

Life Cycle: - metamorphosis incomplete
- female lays about 100 eggs in crevices and under objects
- eggs are white and smooth at first, then turn brown
- nymph becomes scaly at 3rd moult
- nymphal stage is from 2 to 4 months
- life cycle is about 3 months to 2 years

Habits: - originally from warm countries, it has adapted itself to cooler climates by dwelling in warm humid places
- requires very humid conditions
- feed on flour, starch, sugary materials and paper products
- found in moist warm areas of the house

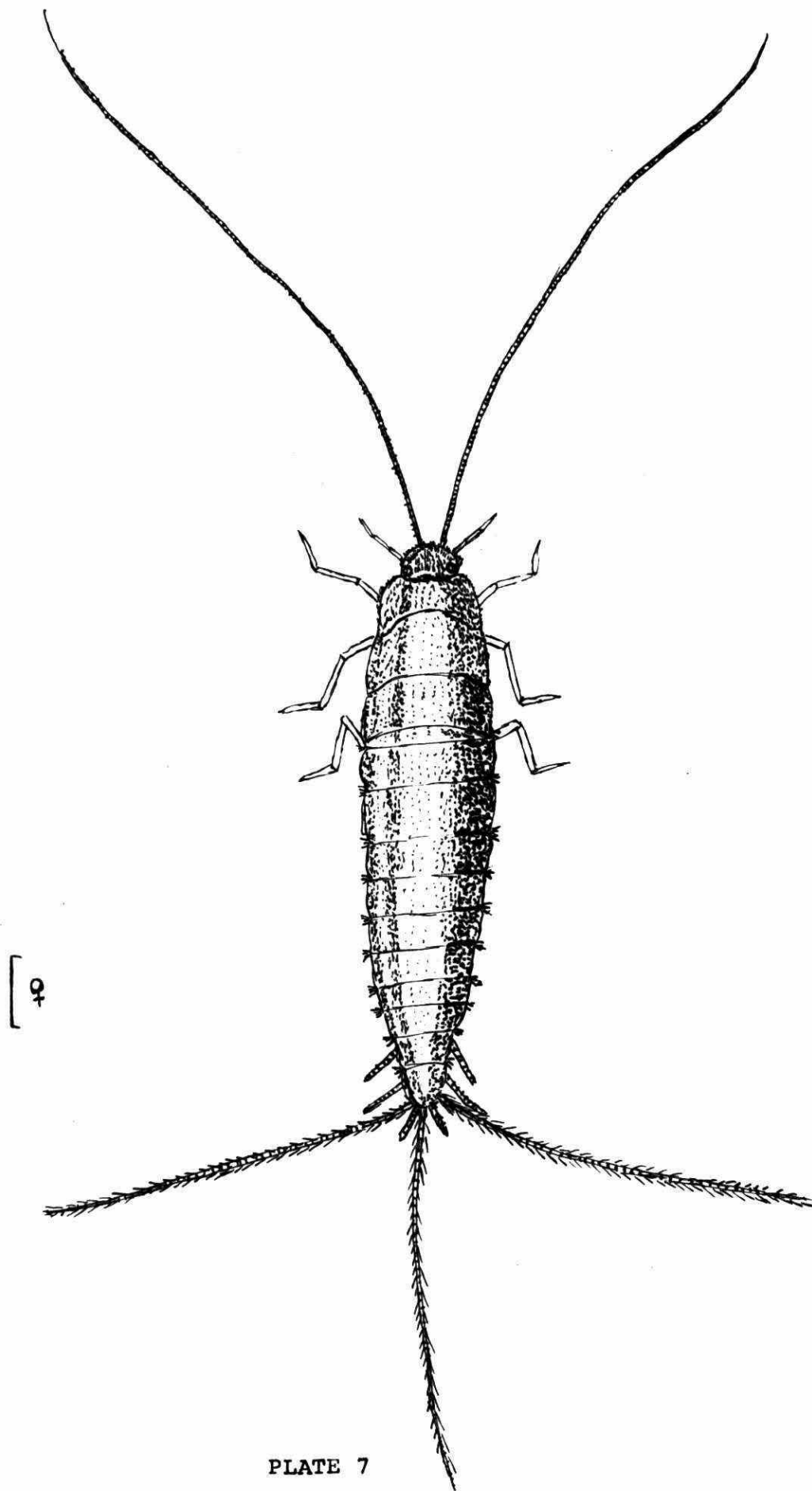


PLATE 7
FIREBRAT

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FIREBRAT
Thermobia domestica

Common Name: firebrat

Size: Adult $\frac{1}{2}$ inch long
nymph has continuous instars through life, 45 to 60

Appearance: - greyish in colour with numerous dark markings
- females have 3 pairs of styli
- males have 2 pairs of styli
- wingless
- 2 long antenna on head
- 3 long bristles at end of abdomen

Life Cycle: - metamorphosis incomplete
- female deposits eggs in crevices
- number of eggs averages 50
- eggs are white and opaque, 1mm long, 7 mm wide
- nymphs are white and opaque - 2 mm long
- nymphal stage is from 2 to 4 months
- life cycle 3 months to 2 years

Habits: - originally from warm countries, it has adapted itself to cooler climates by dwelling in warm humid places
- found indoors in extremely warm places such as restaurant kitchens, bakeries etc.
- likes the dark and will scurry into crevices when the light is turned on
- attacks basically paper products

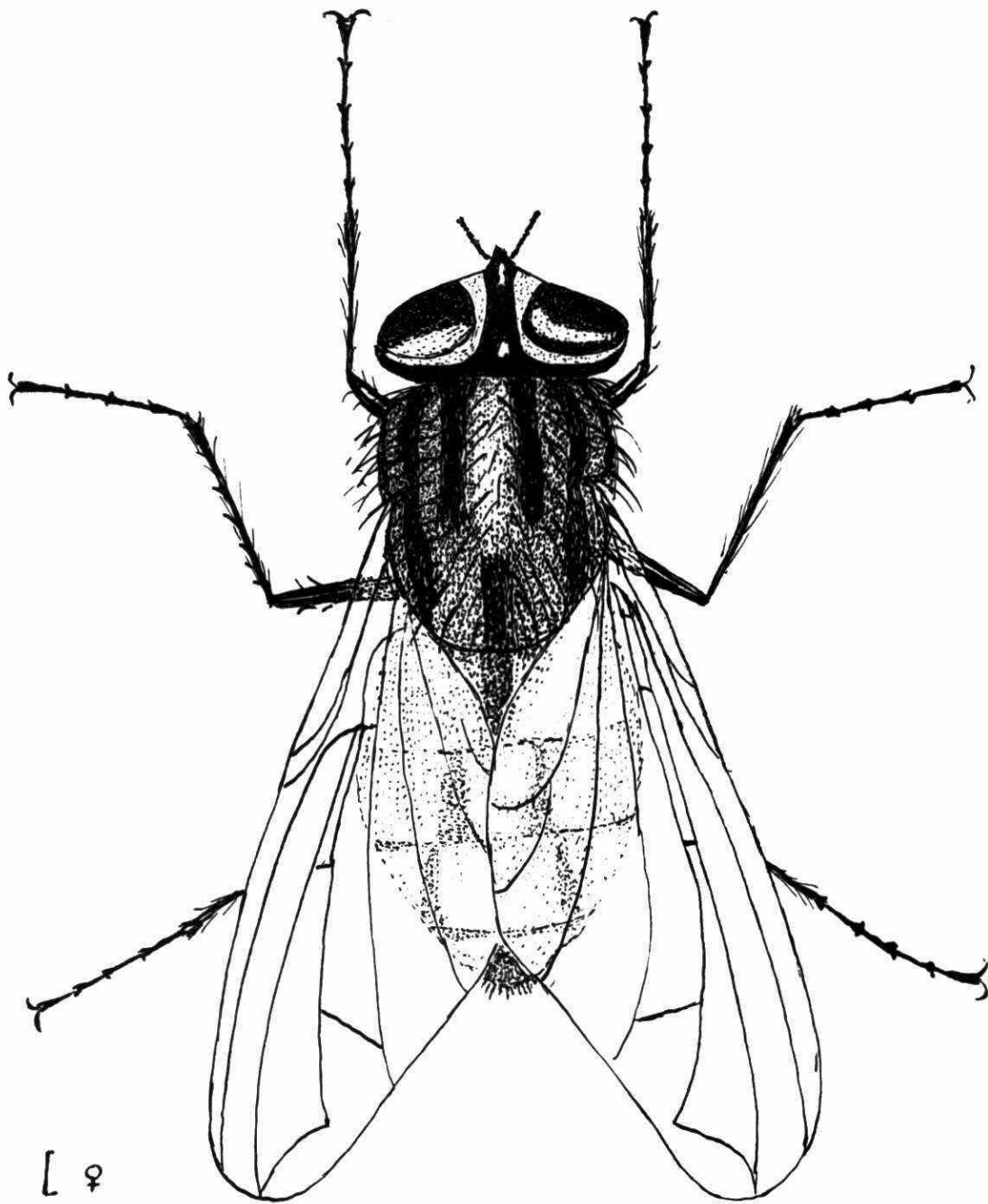


PLATE 8
HOUSEFLY

HOUSE FLY
Musca domestica

Common Name: house fly

Size: Adult, 4 to 7.5 mm long

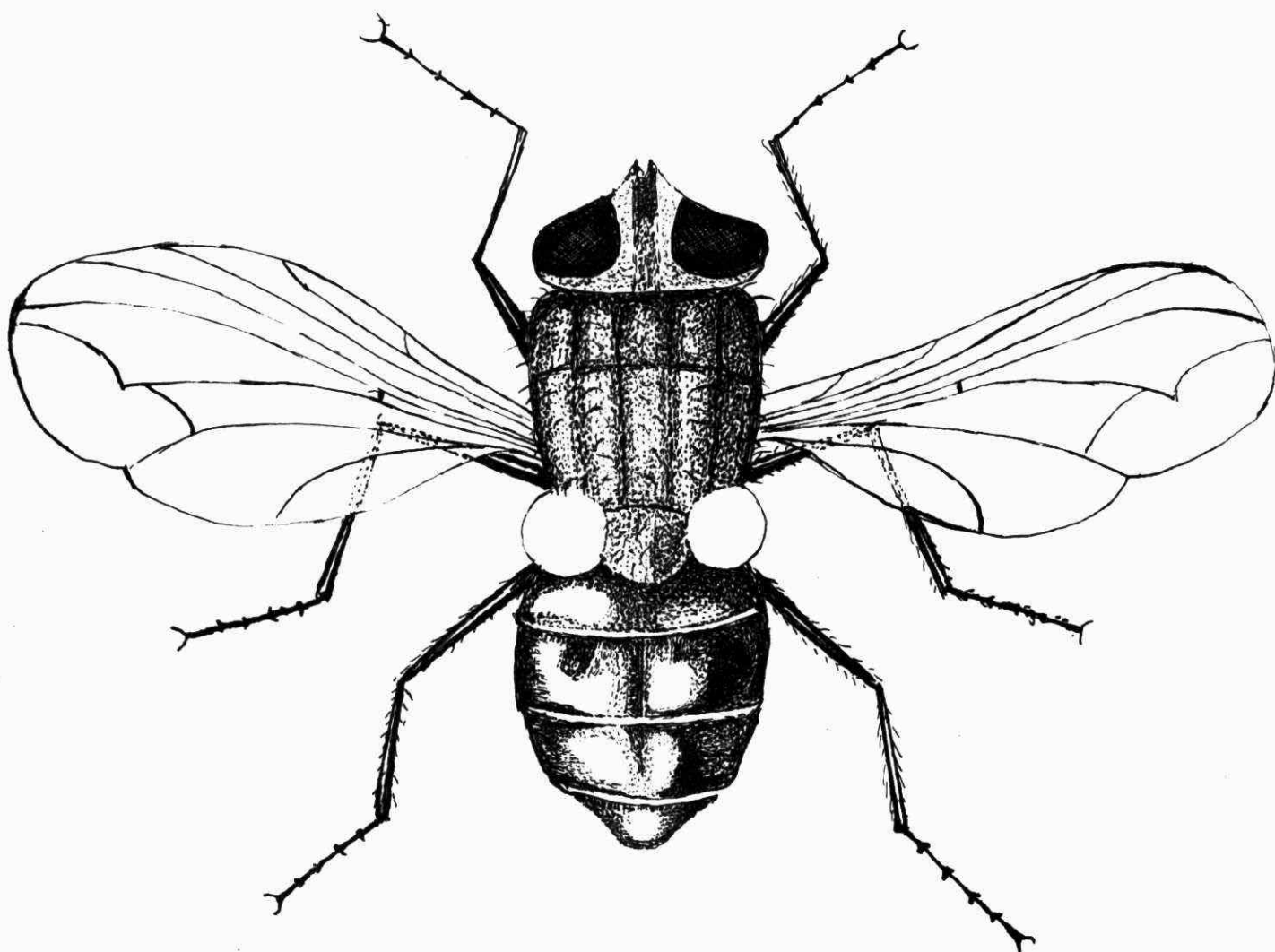
Egg, 1 mm long

Larva, 7 to 10 mm long

Appearance: - Adult, dusky grey colour
- four dark longitudinal stripes on thorax
- fourth longitudinal vein has sharp upward bend
- pad shaped mouthparts not fitted for biting
- wings project backward when at rest
- egg is glistening white colour
- larva is greasy cream colour and footless
- posterior spiracles have sinuous slits
- pupa varies in colour with age, yellow, red, brown to black

Life Cycle: - metamorphosis complete
- eggs are laid in any moist animal or vegetable matter
- eggs are laid in batches of 120 to 150
- female may lay up to 900 eggs
- eggs hatch in warm weather in 8 to 20 hours
- larva has 3 instars and requires 3 to 7 days
- pupal stage lasts 3 to 4 days
- life cycle 6 to 20 days

Habits: - found in homes throughout the world
- common carrier of disease
- feeds on any liquid or solid matter



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PLATE 9
CLUSTERFLY

CLUSTER FLY
Pollenia rudis

Common Name: cluster fly

Size: Adult, 1/3 inch (slightly larger than house fly)
larva, 7 to 10 mm long

Appearance: - non metallic dark grey colour
- no stripes on thorax
- golden hairs
- dark grey abdomen with lighter patches
- wings overlap at tips when resting
- longitudinal vein in wing has sharp bend
- buckwheat honey smell when crushed

Life Cycle: - metamorphosis complete
- eggs are laid in the soil under leaves
- eggs hatch in 1 week on earth worm
- larva bores into a worm and develops in worm's body
- larval stage lasts from 13 to 22 days
- pupal stage lasts from 11 to 14 days
- life cycle 27 to 39 days
- there can be 4 generations during the summer

Habits: - hibernate in clusters in buildings, usually
in attics or little used rooms
- do no damage but are a great nuisance

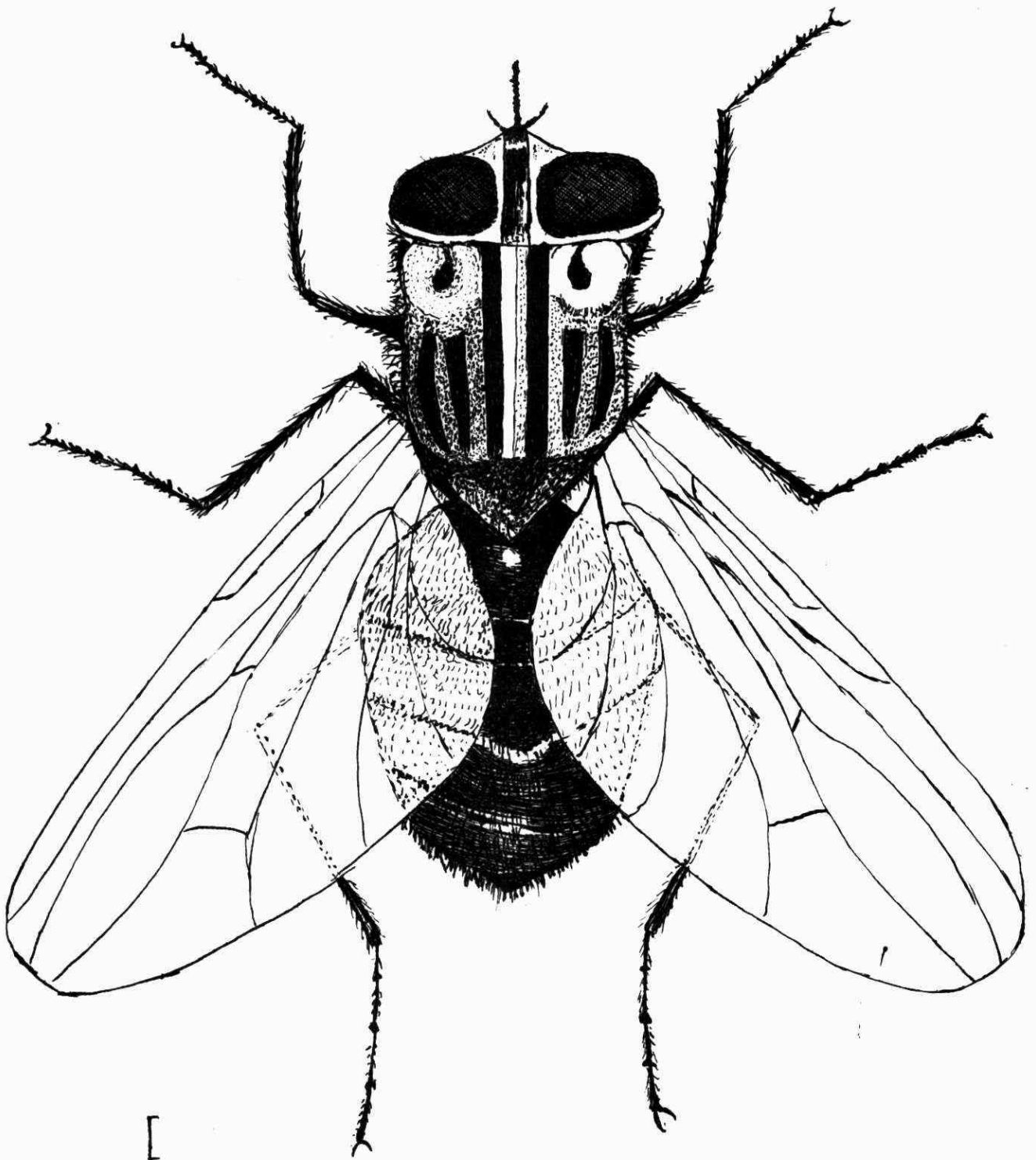


PLATE 10

STABLE FLY

R.K.M. 3/10/72

STABLE FLY
Stomoxys calcitrans

Common Names: stable fly, biting house fly, beach fly, dog fly

Size: Adult, 4 to 7.5 mm long
Egg, 1/125 inch long
Larva, 7 to 10 mm long

Appearance: - adult, dusky grey colour
- bayonet like proboscis
- slender beak from lower part of head
- thorax has longitudinal bands
- light coloured area between bands
- round dark spots on abdomen
- wings project at angle to body when at rest
- eggs are ovoid shaped and cream coloured
- larva are yellowish white maggots
- longitudinal vein in wing curves up

Life Cycle: - metamorphosis complete
- eggs hatch in 1 to 3 days
- larva has 3 instars, completed in 11 to 30 days
- pupal stage is 6 to 20 days
- life cycle 21 to 60 days
- the average adult lives 20 days

Habits: - generally found in stables
- will invade the house and bite humans
- both male and female are bloodsucking

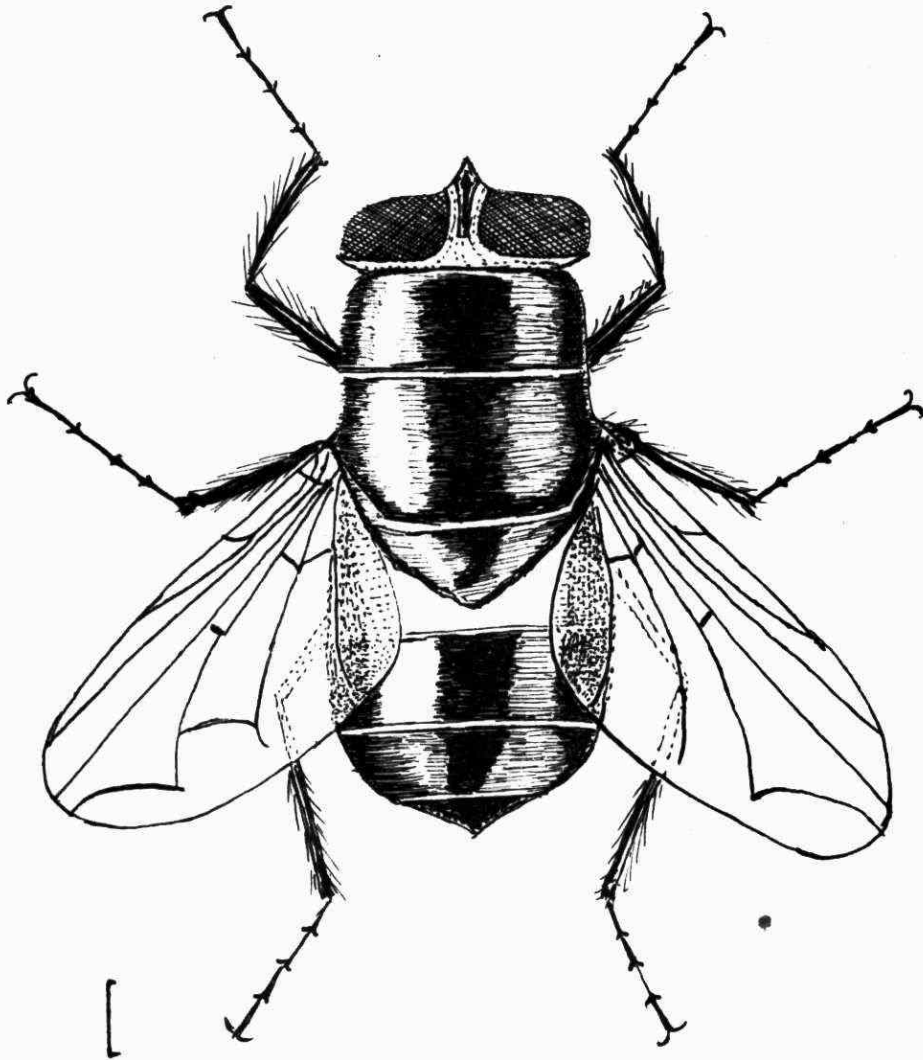


PLATE 11
GREENBOTTLE FLY

GREENBOTTLE FLY
Phaenicia sericata

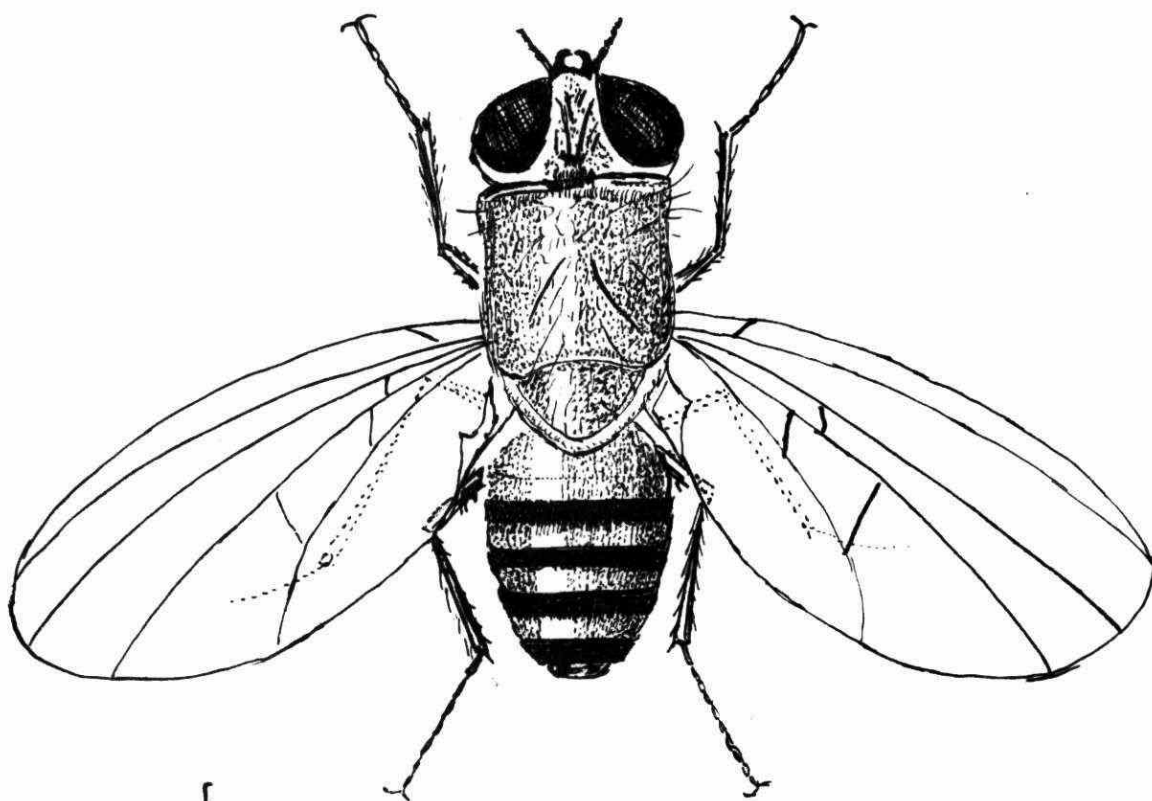
Common Name: Greenbottle fly

Size: Adult, 10 mm long
Egg, 1.5 mm long
Larva, 7 to 10 mm long

Appearance: - adult, mettalic blue-green colour
- dusted with white on abdomen
- larger than house fly
- eggy creamy white
- larva, whitish
- pupa, dull red brown
- cylindrical with rounded ends

Life Cycle: - metamorphosis complete
- eggs are laid on flesh or dead animals
- female may lay up to 600 eggs
- eggs hatch in 18 to 48 hours
- larva or maggotts feed on and bore into flesh
- larval stage lasts 8 to 11 days
- pupal stage last 9 to 12 days
- life cycle about 35 days in summer

Habits: - normally found outdoors
- will occasionally enter house in search of food
- annoying to housewife and detected by loud buzzing noise



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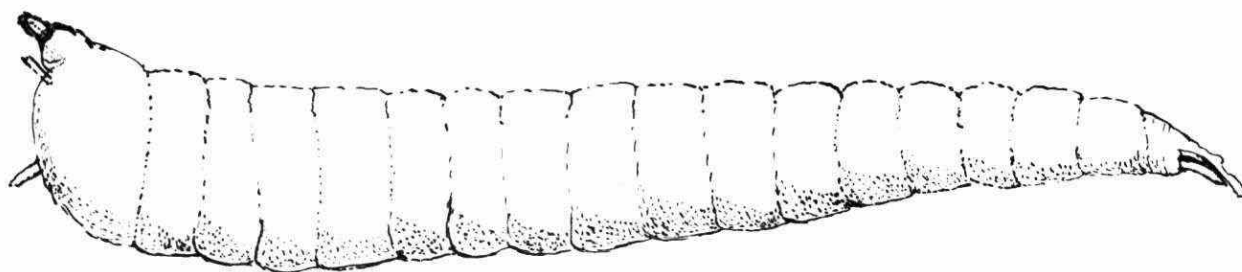


PLATE 12

FRUIT FLY

R.K.M.4/10/72

FRUIT FLY
Drosophila melanogaster

Common Names: Fruit fly, vinegar fly

Size: Adult, 3 mm long
Larva, small and slender

Appearance: - adult, light reddish brown
- bright red eyes
- tan coloured thorax and head
- black abdomen
- greyish under surface
- larva, white
- headless
- head end pointed

Life Cycle: - metamorphosis complete
- female lays 15 to 25 eggs each day until a total of 400 to 900 eggs are laid
- eggs hatch in about 30 hours
- larva bury themselves and feed on decaying fruits or fermenting liquids
- larval period is from 5 to 6 days
- life cycle may be 8 days

Habits: - found around fermenting liquids or decaying fruits
- does not do any particular damage but is a nuisance

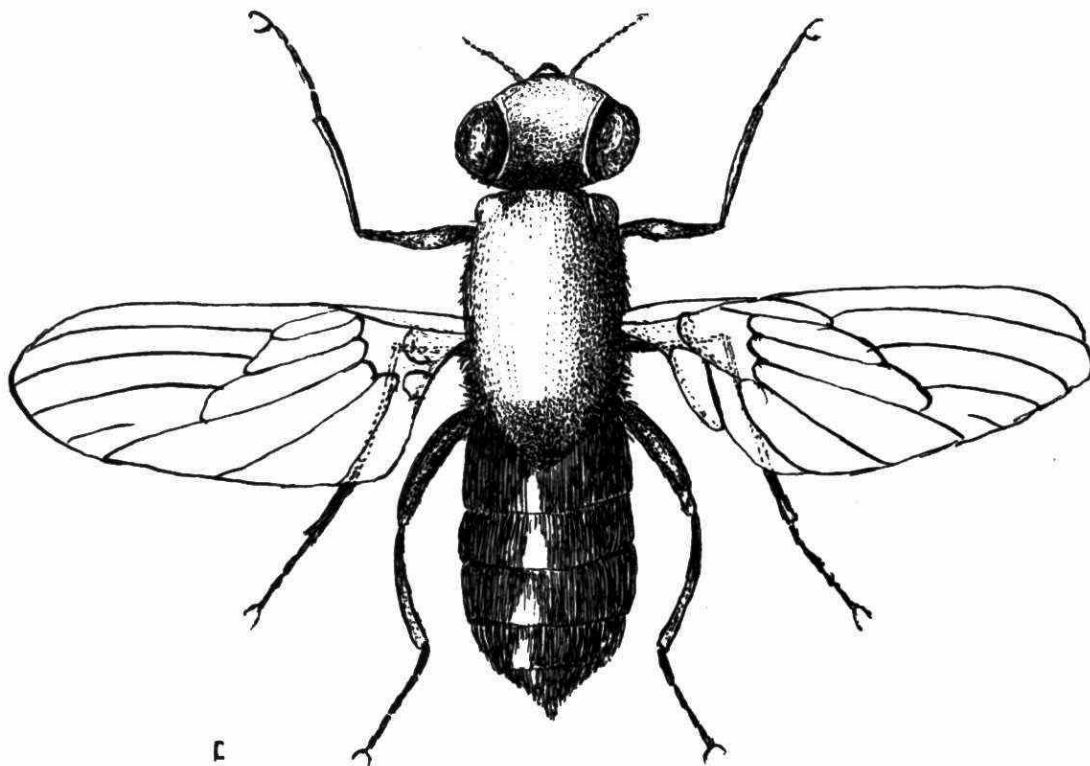


PLATE 13
CHEESE SKIPPER

CHEESE SKIPPER
Piophilidae casei

Common Name: cheese skipper

Size: 1/3 the size of the house fly

Appearance: - adult, a black fly with bronzy tints on thorax
- reddish brown eyes
- slightly iridescent wings lie flat over body when at rest
- has lapping mouthparts
- larva, slender and pointed anteriorly
- ambulatory teeth on ventral surface
- larva moves by skipping

Life Cycle: - metamorphosis complete
- eggs are laid on meat or cheese or in cracks and crevices of wrapping
- eggs hatch in 1 to 4 days
- larval stage varies from 5 days to 8 months
- pupal stage lasts about 5 days
- average life cycle 15 days

Habits: - particular pest of ham and cheese
- damage is done by the larva
- larva can readily penetrate the food
- carrier of disease

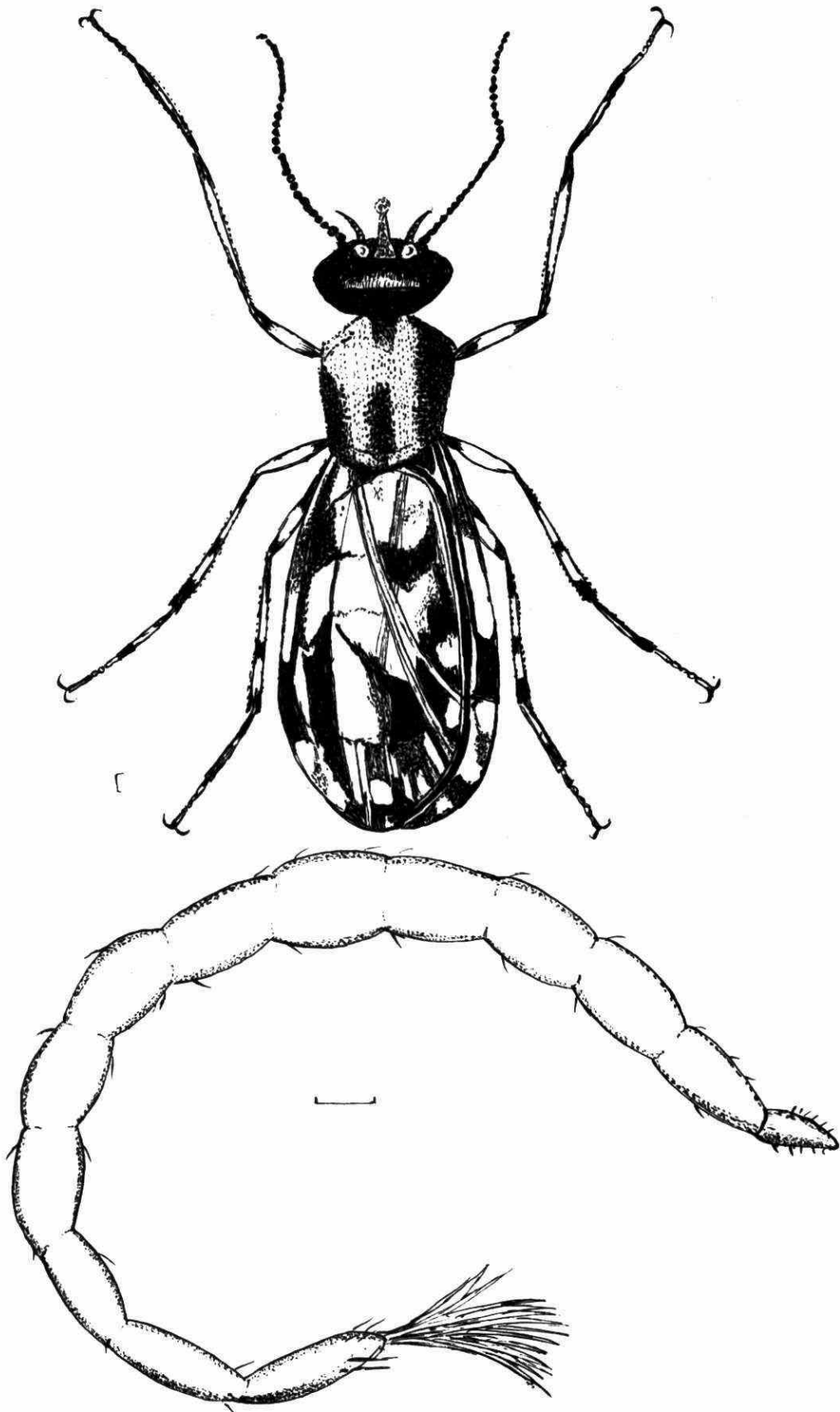


PLATE 14

SAND FLY

R.K.M. 5/10/72

SAND FLY
Culicoides conithorax

Common Names: sand fly, punkies, black gnats

Size: Adults, 1 to 3 mm long
larva, 5 to 8 mm long

Appearance: - adult, black
- black and white mottled wings
- bloodsucking gnats
- larva, white
- long rounded body
- black head
- elongated tufts on caudle end
- hairy spines on body

Life Cycle: - metamorphosis complete
- female must have 3 to 4 blood meals before
depositing eggs
- breed in marshes, mud, plant debris, etc.
- larval stage is 6 months or longer
- pupal stage 3 to 7 days

Habits: - they bite severely and leave lesion that
may take several weeks to heal

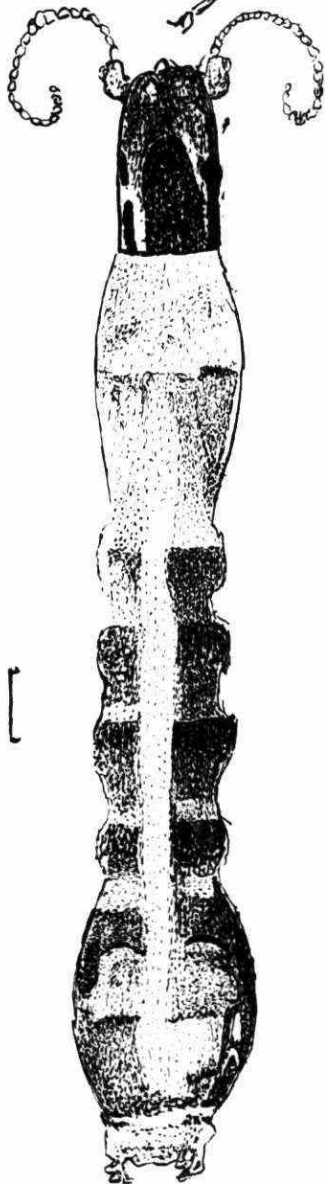
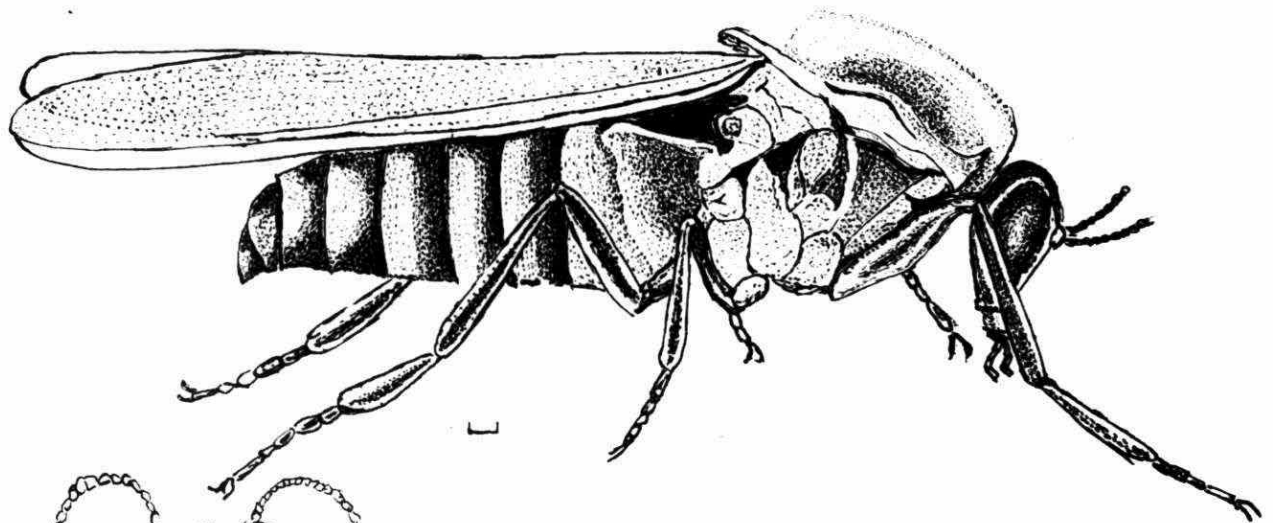


PLATE 15
BLACK FLY

R.K.M.5/10/72

BLACK FLY
Simuliidae

Common Names: black fly, buffalo gnat

Size: Adult, 1 to 5 mm long
larva, 3/8 inch long

Appearance: - adult, black, sometimes grey or red
- hump backed thorax
- antennae has 11 segments
- no scales or hair on wings
- piercing mouthparts
- only females are bloodsuckers
- larva, dark brown or green
- sucker like discs and tiny hooks on abdomen
help retain position in water

Life Cycle: - metamorphosis complete
- breeds in water
- female lays approximately 500 eggs
- life cycle about 6 weeks
- there may be 1 or more generations a year

Habits: - generally found in northern latitudes in
late spring and early summer
- carriers of disease
- noted for severe biting

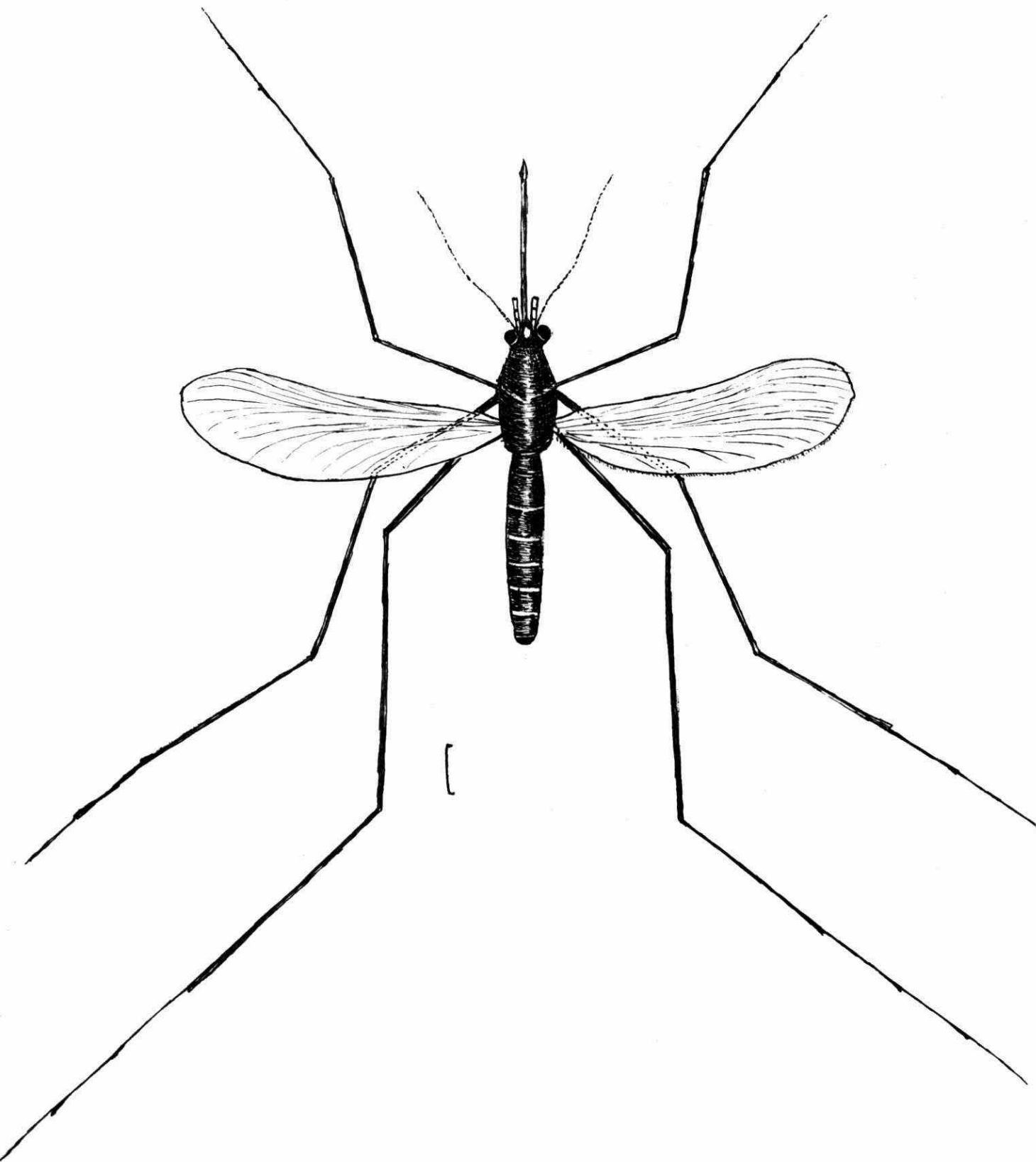


PLATE 16
HOUSE MOSQUITO

PLATE 17
LIFE CYCLE OF HOUSE MOSQUITO

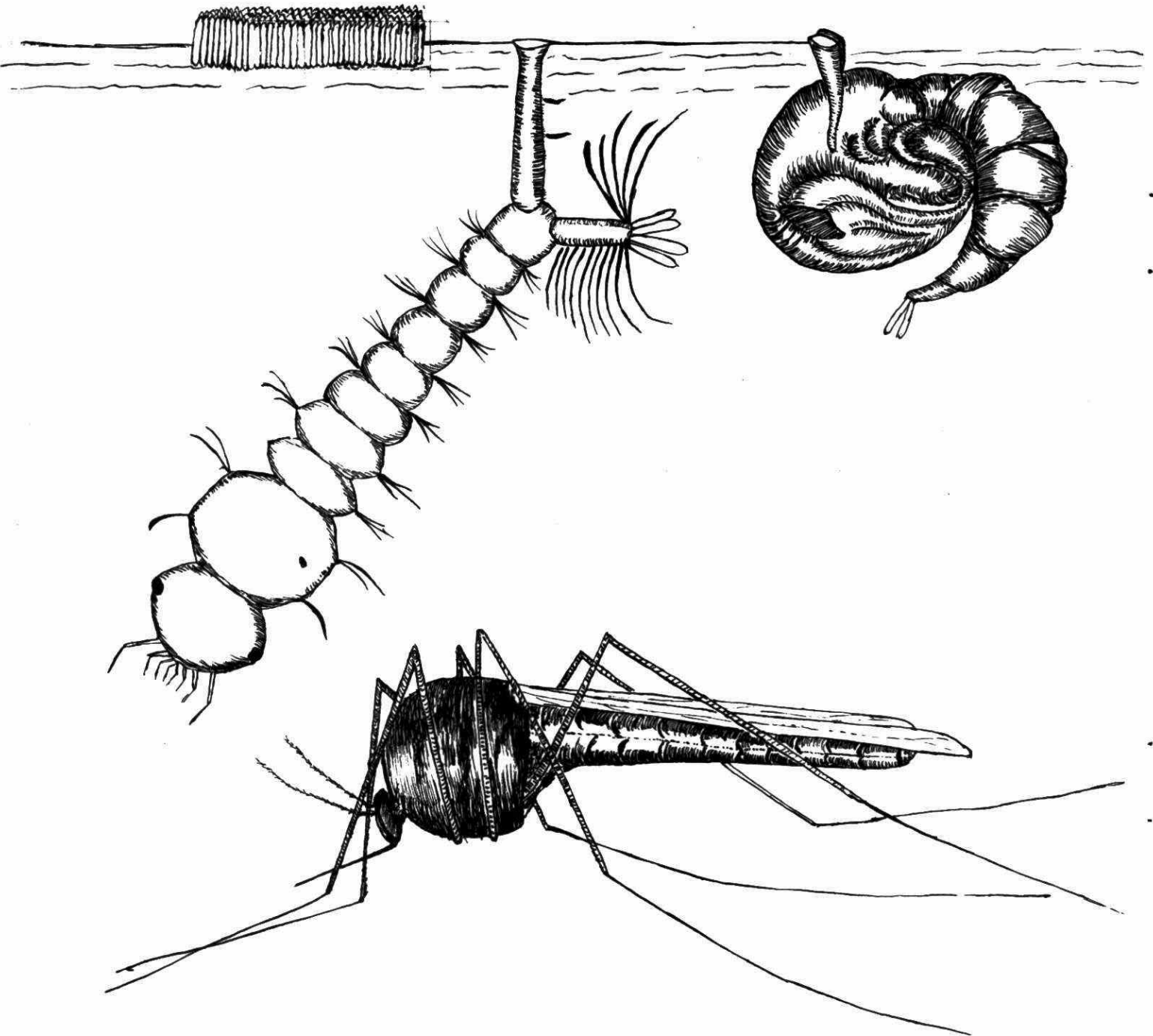


PLATE 17

LIFE CYCLE OF HOUSE MOSQUITO

HOUSE MOSQUITO
Culex pipiens

Common Name: house mosquito

Size: Adult, 7 mm long

Egg, spindle shaped, 2 to 3 mm long

Larva, small

Appearance: - adult, pale brown
- whitish bands across abdomen
- body covered with scales
- mouthparts are elongated
- proboscis used for piercing and bloodsucking
- thorax is deep but thin
- wings long and narrow
- abdomen long and thin
- larva are semi transparent with light brown markings
- head and thorax is distinct
- abdomen has 9 segments

Life Cycle: - metamorphosis complete
- eggs hatch only in water
- female lays raft like masses of eggs
- she may lay several masses of 50 to 400 eggs
- larva moults 4 times before maturity
- life cycle may be 7 to 10 days

Habits: - serious pest in homes
- inflicts painful bite which becomes itchy
- detected by humming noise

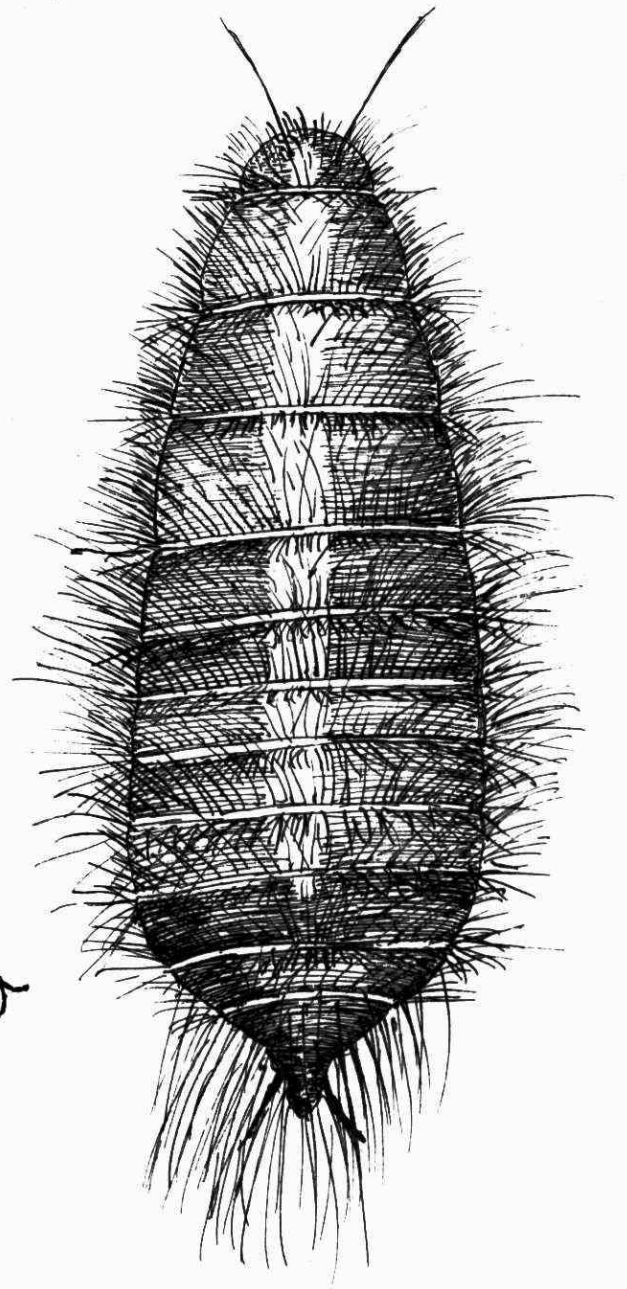
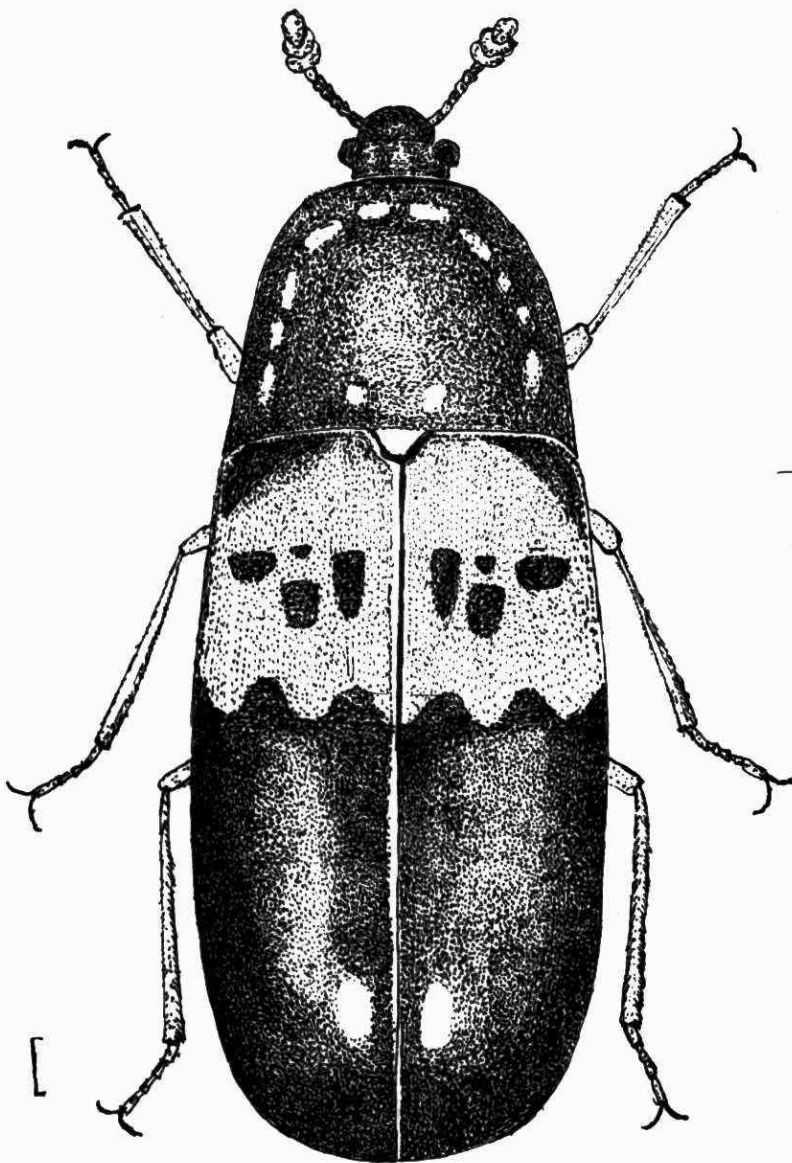


PLATE 18
LARDER BEETLE

LARDER BEETLE
Dermestes lardarius

Common Name: larder beetle

Size: Adult, 7 to 9 mm long
Larva, 11 to 13 mm long

Appearance: - adult, dark brown with yellow, six spotted band
on the living cases (elytra)
- underside of body and legs covered with yellow hairs
- larva, brownish
- two curved spines on last visible body segment

Life Cycle: - metamorphosis complete
- eggs are laid close to food
- females lay 102 to 174 eggs
- eggs hatch in 12 days or less
- male larva moults 5 times
- female larva moults 6 times
- pupal stage lasts 3 to 7 days
- life cycle 2 to 3 months

Habits: - attacks cheese, bacon and ham in the home
- also infests hide and skin warehouses and premises
where bones and pit foods are processed
- sometimes damages museum specimens
- damage is done by the larvae

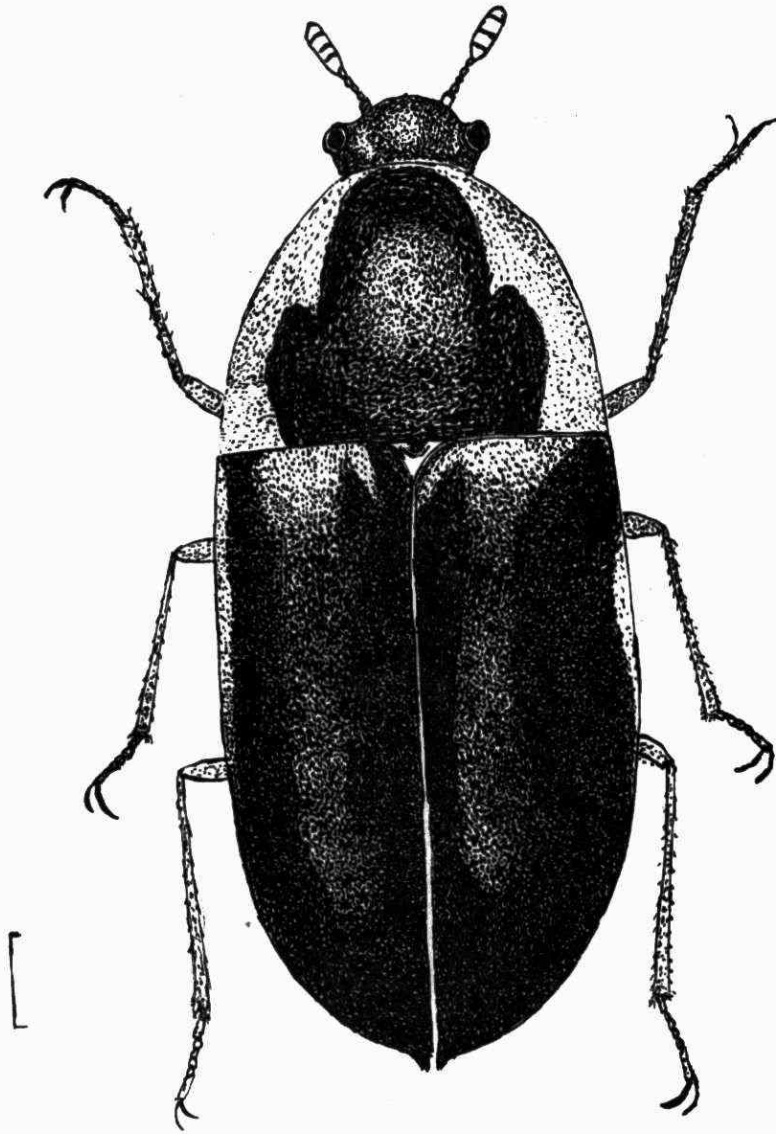


PLATE 19
HIDE BEETLE

HIDE BEETLE
Dermestes maculatus

Common Names: hide beetle

Size: Adult, 5 to 10 mm long
Larva, 11 to 13 mm long

Appearance: - adult, black on top, white underneath
- wing covers dark all over
- apex of elytra tapers to fine point
- larva, brownish and hairy

Life Cycle: - metamorphosis complete
- females lay eggs in cracks in skins, hides, etc.
- eggs hatch in 2 to 12 days
- larva has 5 moults
- larval stage 30 days
- pupal stage 7 days
- life cycle 60 to 70 days

Habits: - attacks hides and skins
- damage is done by the larva

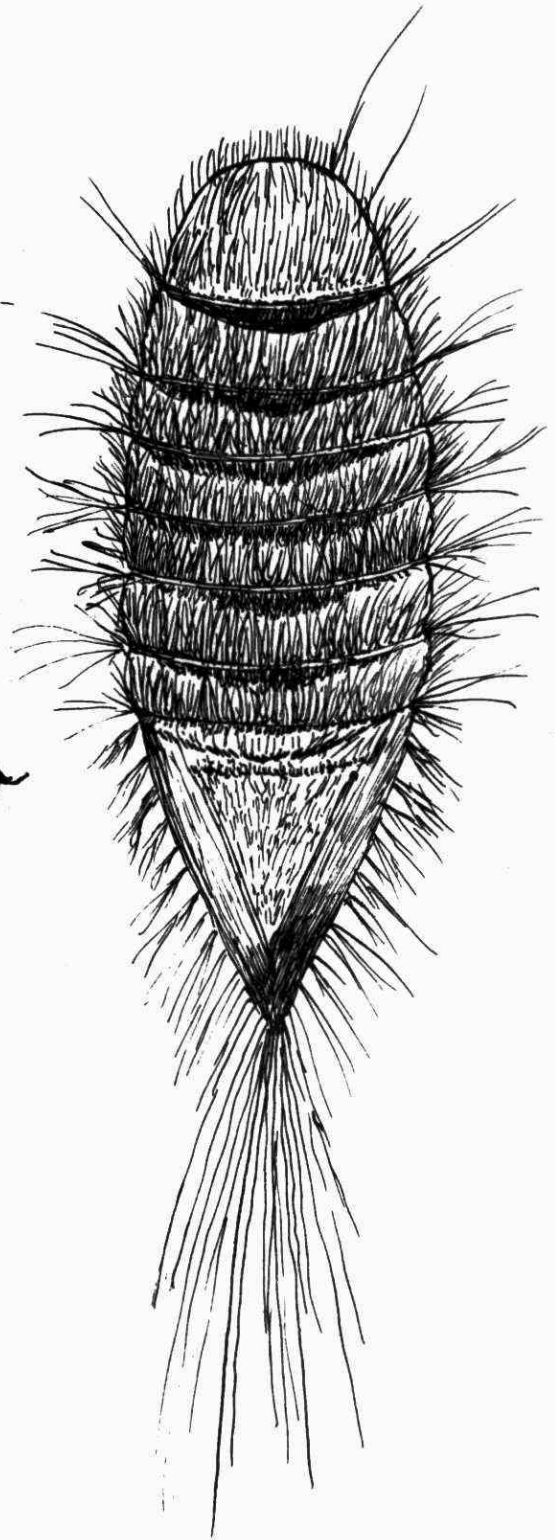
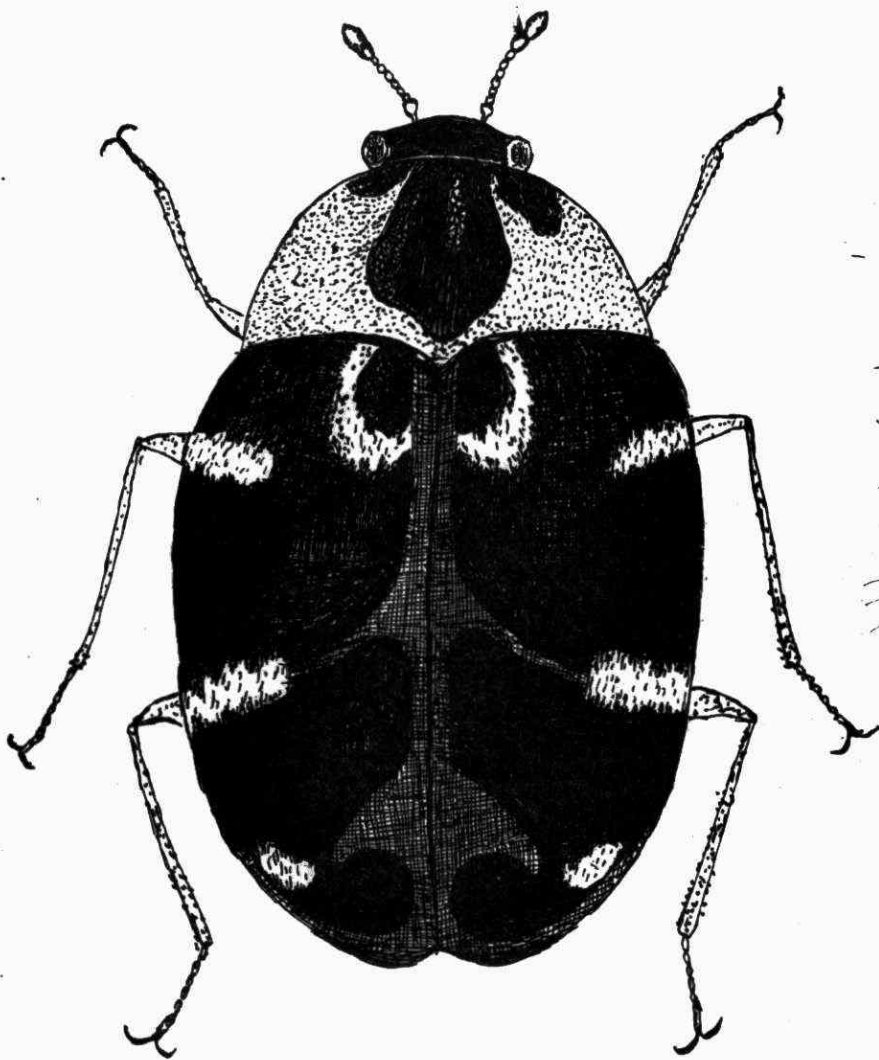


PLATE 20
CARPET BEETLE

CARPET BEETLE
Anthrenus scrophulariae

Common Name: carpet beetle

Size: Adult, 3 mm long
Larva, 2.5 to 3.5 mm long

Appearance: - adult, black with white scales
- longitudinal orange-red scales
- larva, reddish brown with numerous black
or brown hairs

Life Cycle: - metamorphosis complete
- eggs are laid in textiles
- eggs hatch in 10 to 18 days
- larva has 6 instars
- larval stage averages 66 days
- pupation takes place in last larval skin
- pupal stage averages 13 days
- life cycle averages 95 days

Habits: - attacks carpets and other woollen and
animal products
- damage is done by the larva

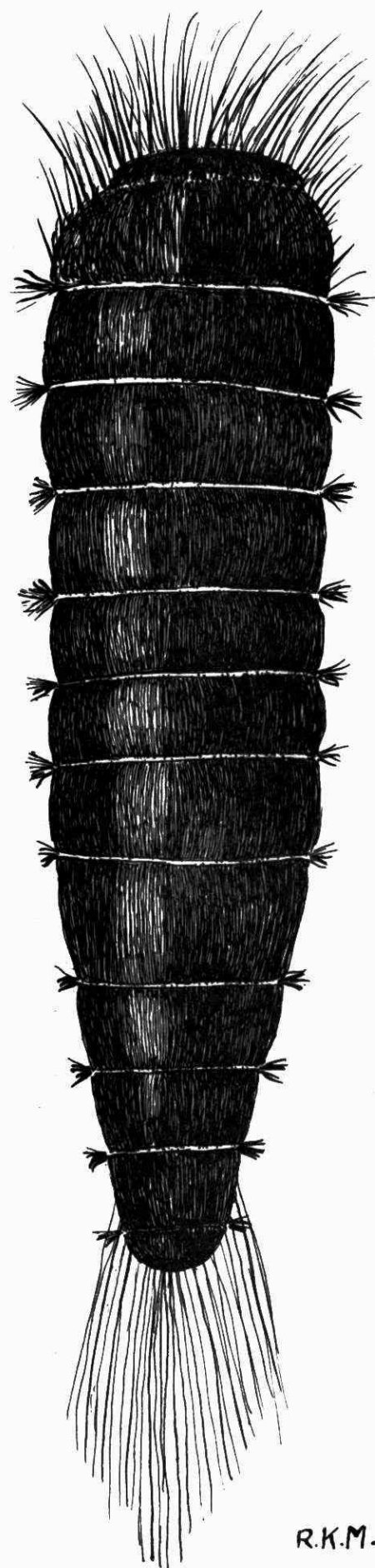
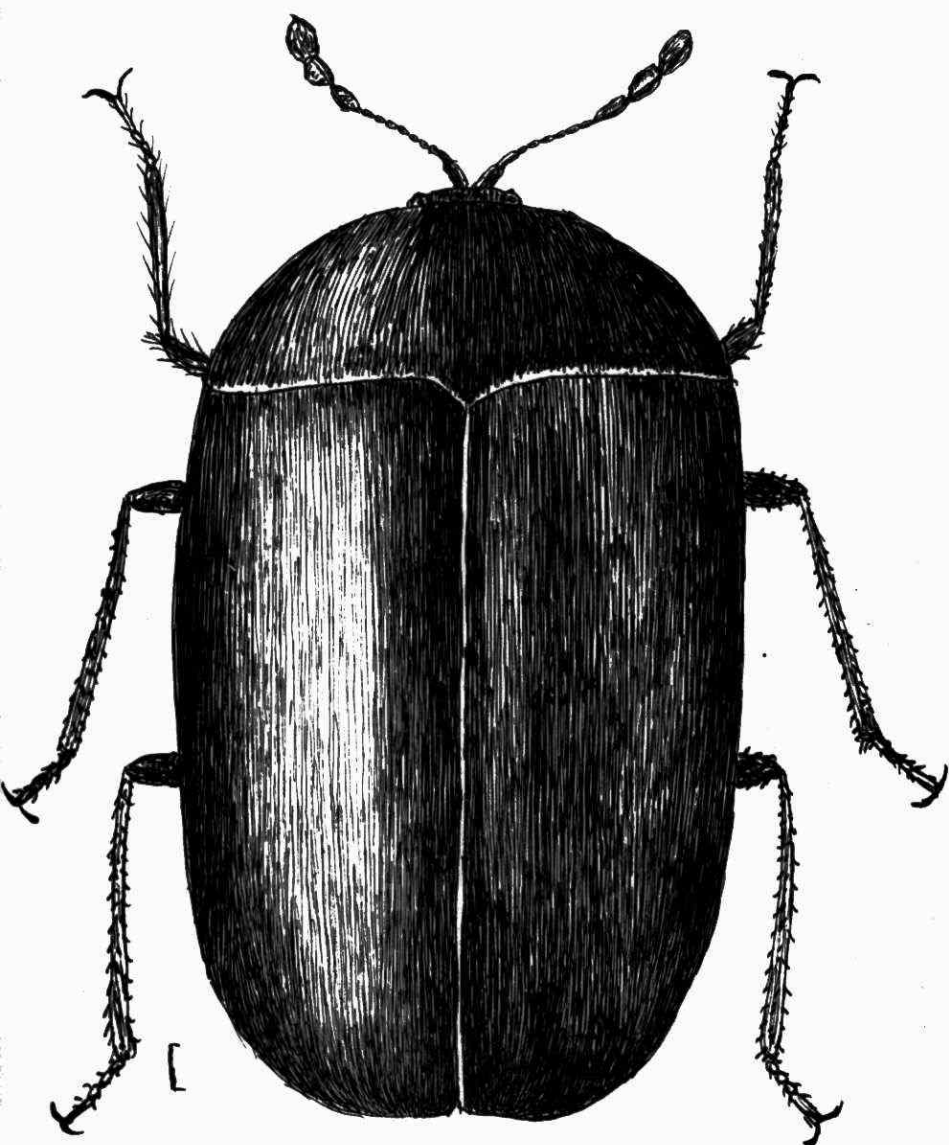


PLATE 21
BLACK CARPET BEETLE

BLACK CARPET BEETLE
Attagenus megatoma

Common Name: black carpet beetle

Size: Adult, 2.8 to 5 mm long
larva, 7 to 8 mm long

Appearance: - adult, dark brown or black
- basal segments of antennae and legs pale brown
- larva, dark brown to almost golden with long brown hairs

Life Cycle: - metamorphosis complete
- female lays 50 to 100 eggs in carpets and any other dried material of animal origin
- eggs hatch in 6 to 11 days
- larva moults 5 to 11 times
- larval stage takes 65 to 184 days
- pupation takes place in the last larval skin
- pupal stage takes 5 to 18 days
- average life cycle is 1 year

Habits: - attacks carpets, stored woolen garments and furs
- this is the most destructive carpet beetle
- damage is done by the larva

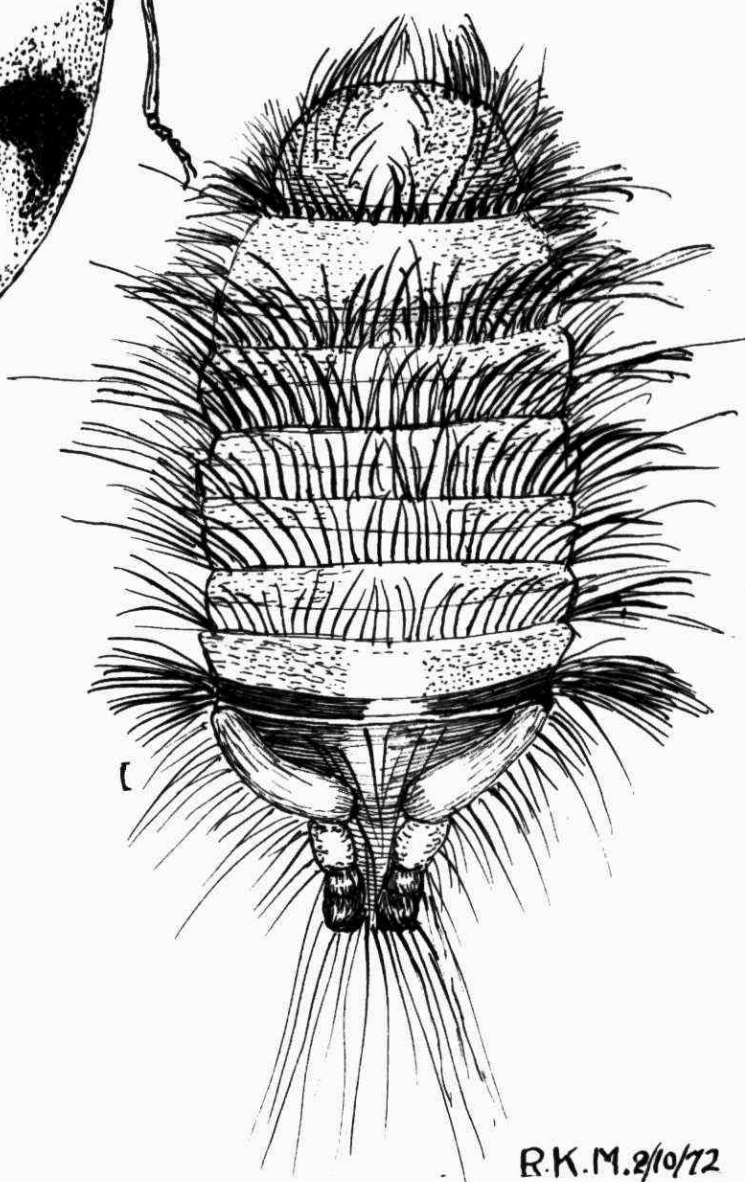
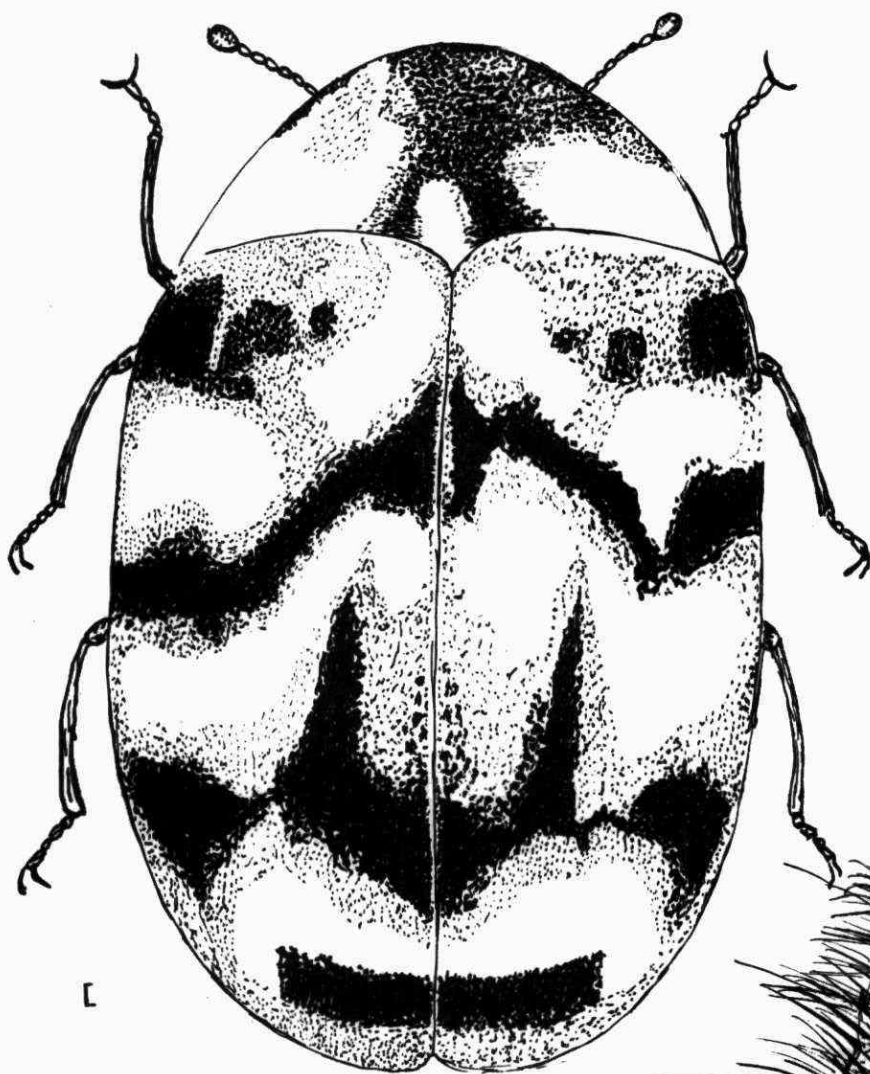


PLATE 22
VARIED CARPET BEETLE

R.K.M. 2/10/72

VARIED CARPET BEETLE
Anthrenus verbasci

Common Name: varied carpet beetle

Size: Adult, 2 to 3 mm long
Larva, 4 to 5 mm long

Appearance: - adult, blackish with various arrangements
of white brown and yellow scales
- oval in shape
- larva, light and dark brown
- transverse stripes with tufts, bristles and hair

Life Cycle: - metamorphosis complete
- female lays 20 to 100 eggs in spring
- eggs are laid on furs, woollens and any dried
animal products
- eggs hatch in about 18 days
- larva moults 6 to 8 times
- pupates in the last larval skin
- life cycle 7 to 14 months

Habits: - attacks a variety of animal and plant materials
- also infests grain products and museum insect collections
- damage is done by the larva

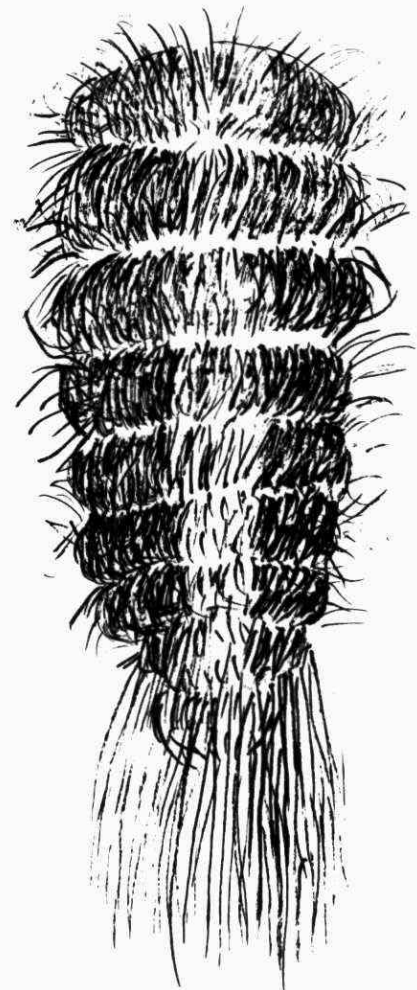
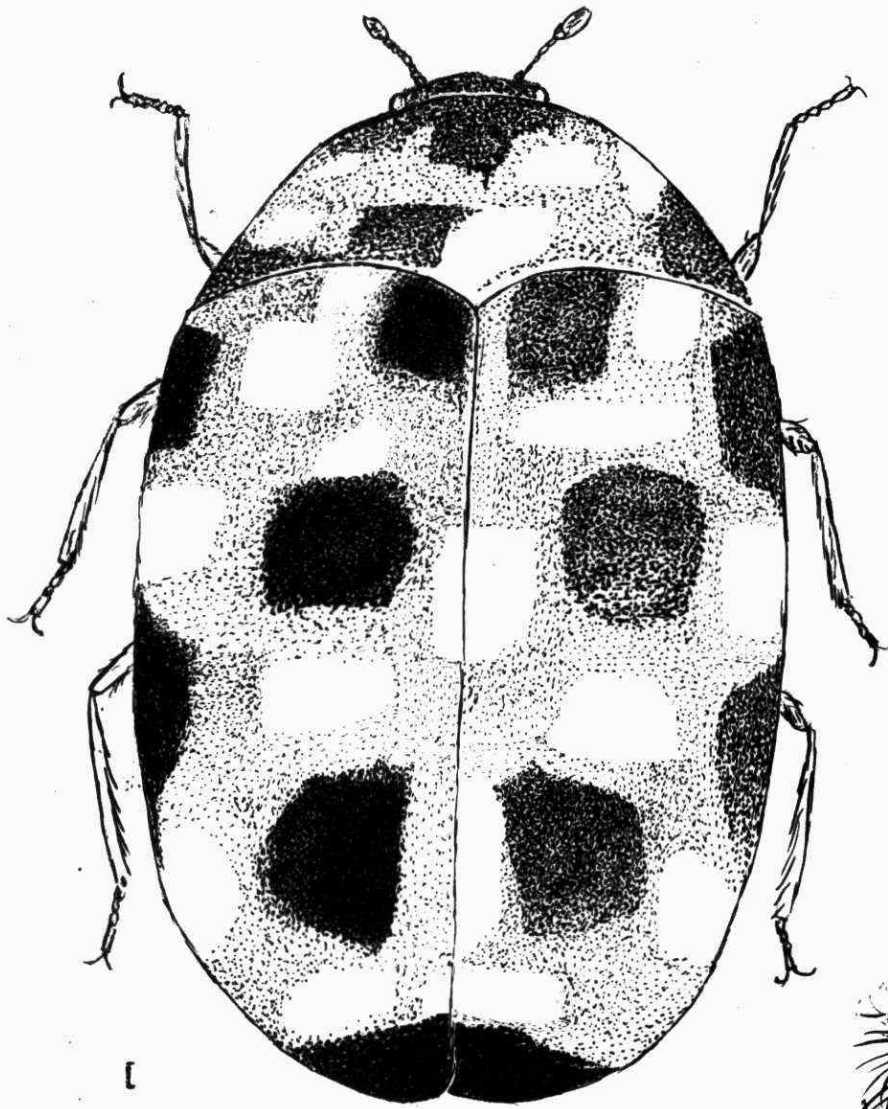


PLATE 23

FURNITURE CARPET BEETLE

FURNITURE CARPET BEETLE
Anthrenus flavipes

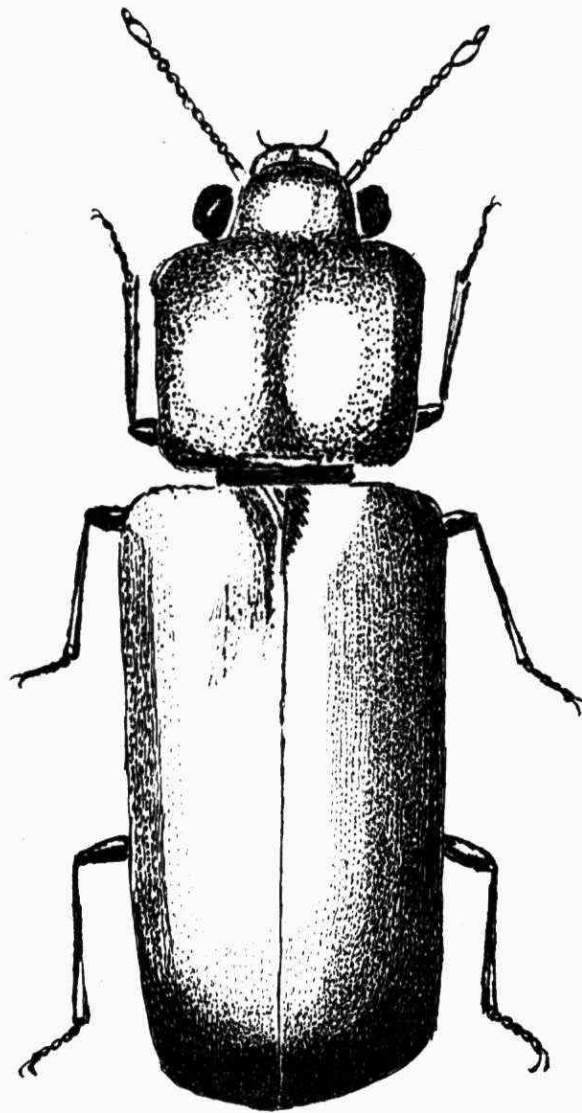
Common Name: furniture carpet beetle

Size: Adult, 2 to 3.5 mm long
Larva, 5 mm long

Appearance: - adult, mottled, blackish with yellow and white scales
- dorsal black appearance
- ventral white appearance
- thick yellow scales on femora of legs
- antenna club - first segment shorter than second
- larva, chestnut brown
- changes colour with different foods

Life Cycle: - metamorphosis complete
- female lays 37 to 96 eggs
- larva instars vary from 6 to 12
- white pupa develops in last larval skin
- life cycle varies from 149 to 422 days

Habits: - attacks a wide variety of materials
- particular pest of hair filled furniture
- damage is done by the larva



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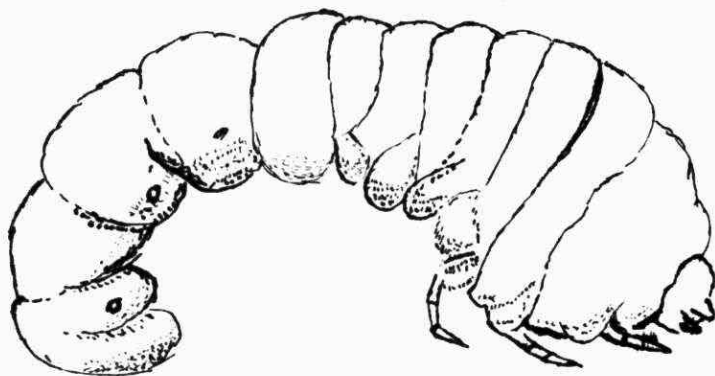


PLATE 24

POWDER POST BEETLE

R.K. M. 9/10/72

PLATE 25

POWDER POST BEETLE

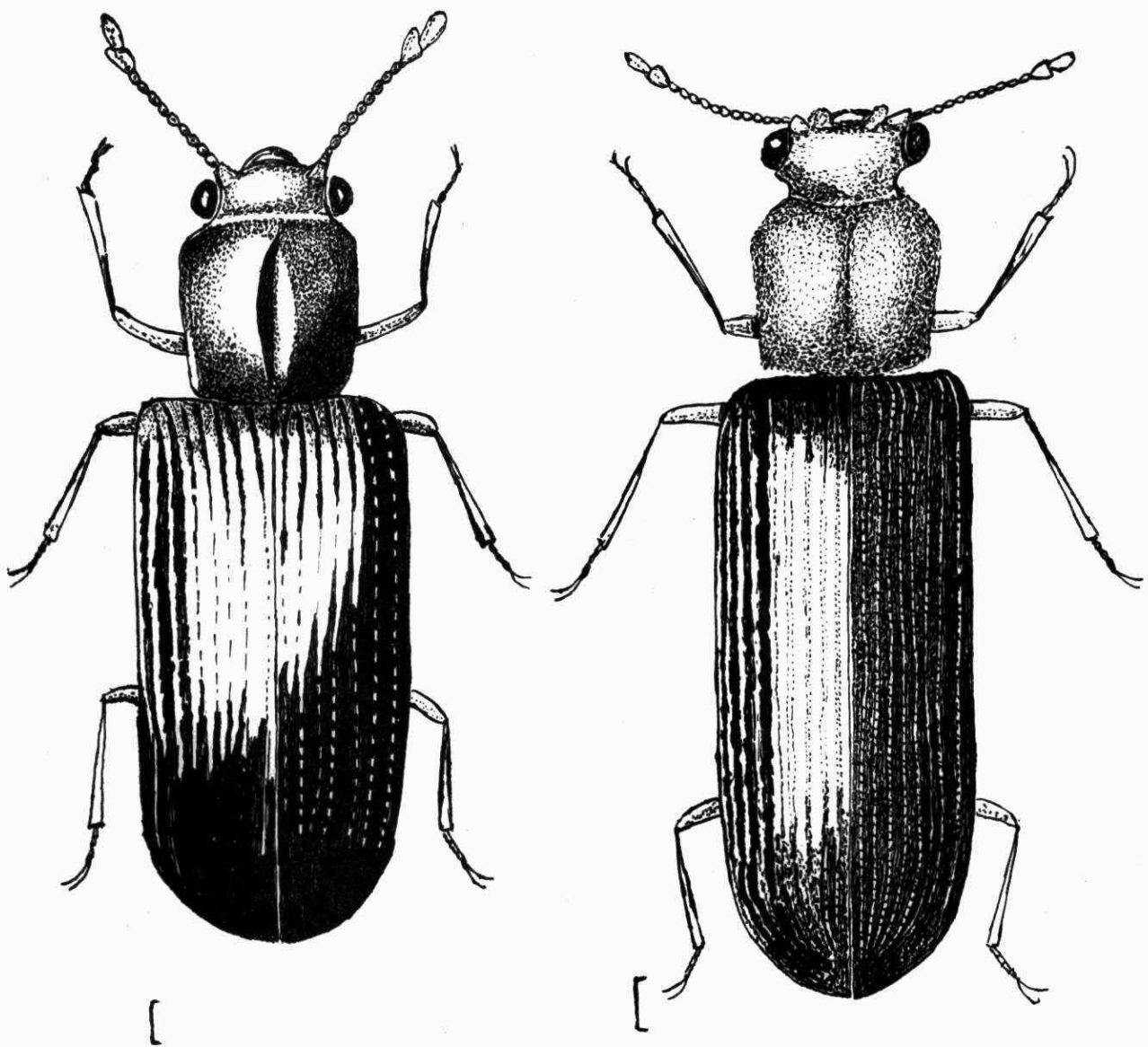


PLATE 25

POWDER POST BEETLE

R.K.M9/10/72

POWDER POST BEETLE

Lyctus brunneus - reddish brown colour
Lyctus linearis - brownish colour
Lyctus planicollis - black colour

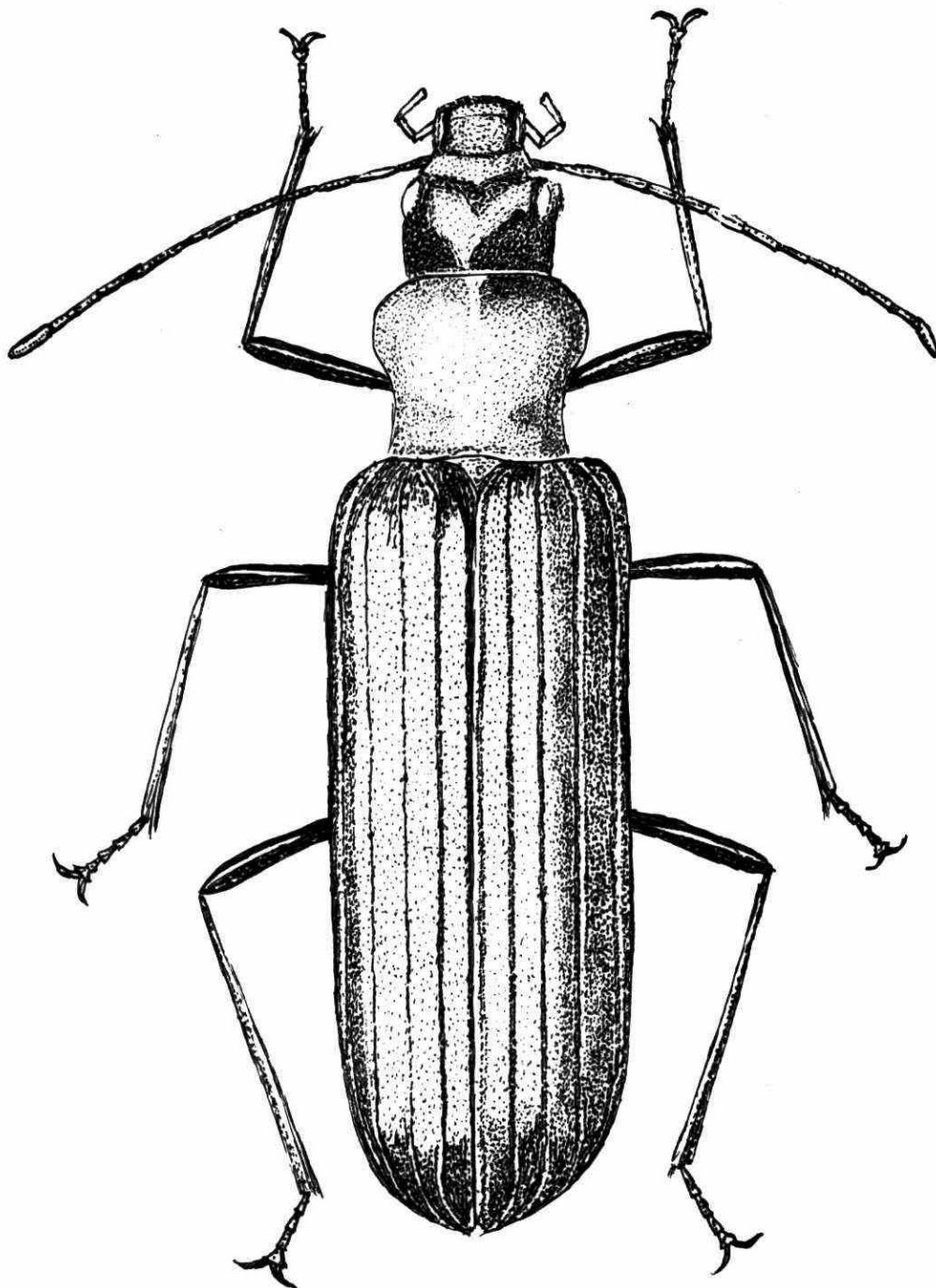
Common Name: powder post beetle

Size: Adult, 2 to 7.5 mm long

Appearance: - prothorax wider in front than behind
- longitudinal rows of small pits are arranged on wing cases
- wing cases covered with short fine hairs
- short antennae with 11 segments
- 2 terminal clubs inserted before the eyes
- tibiae have distinct spurs
- larva, whitish without spinules
- enlarged spiracle of either side, near end of body

Life Cycle: - metamorphosis complete
- eggs are laid in pores of wood
- larva bores into the wood

Habits: - will attack only certain hardwood with starchy sap
- normally attacks furniture, hardwood floors and fittings
- damage is done by the larva



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PLATE 26
WHARF BORER

R. K. M. 10/10/72

WHARF BORER
Nacerdes melanura

Common Name: wharf borer

Size: Adult, 10 mm long
Larva, 30 mm long

Appearance: - adult, brownish to reddish yellow with tips of black
- black tips on elytra, eyes, side of thorax, legs and ventral parts
- body covered with dense yellow hairy scales
- pointed elytra with raised lines
- antennae a bit more than half the length of the body
- larva, cream coloured with brown and black tips

Life Cycle: - metamorphosis complete

Habits: - attacks very moist wood such as pilings, harbour works, driftwood, etc.
- damage is done by the larva

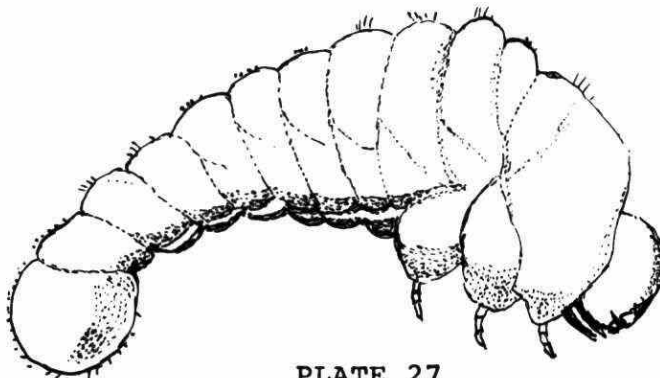
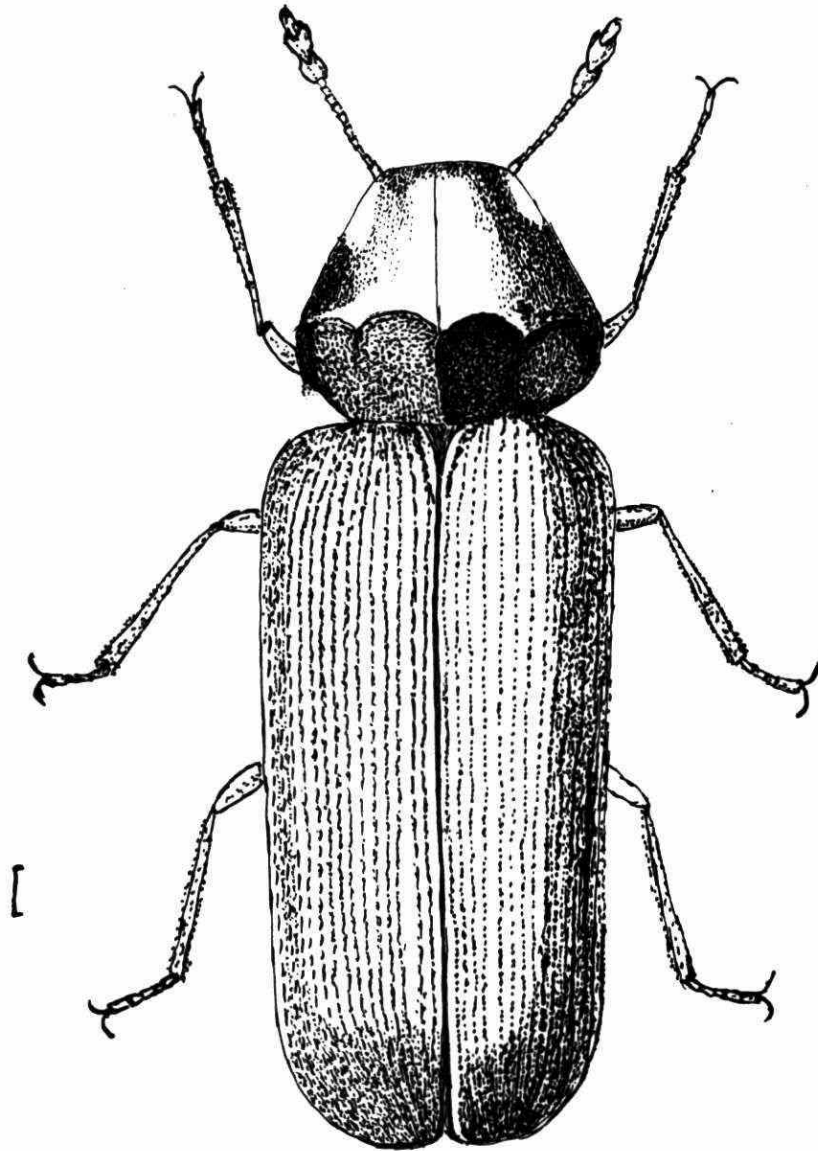


PLATE 27

FURNITURE BEETLE

R.K.M. 10/10/72

FURNITURE BEETLE
Anobium punctatum

Common Name: furniture beetle

Size: Adult, 4 to 6 mm long
Larva, 6 mm long

Appearance: - adult, reddish brown to dark brown
- cylindrical in shape
- longitudinal rows of punctures on dorsum
- 11 segmented antennae
- last 3 segments of antennae distinctive in length and shape
- larva, white with blackish jaws
- 3 pairs of 5 jointed legs
- double rows of small brown spinules on dorsum

Life Cycle: - metamorphosis complete
- female lays 20 to 60 eggs in cracks and crevices
- eggs hatch in 6 to 10 days
- larva bores through wood
- life cycle averages 3 to 4 years

Habits: - outdoors it attacks hardwoods
- indoors it mainly attacks softwoods
- antique furniture often harbours this pest
- damage is done by the larva

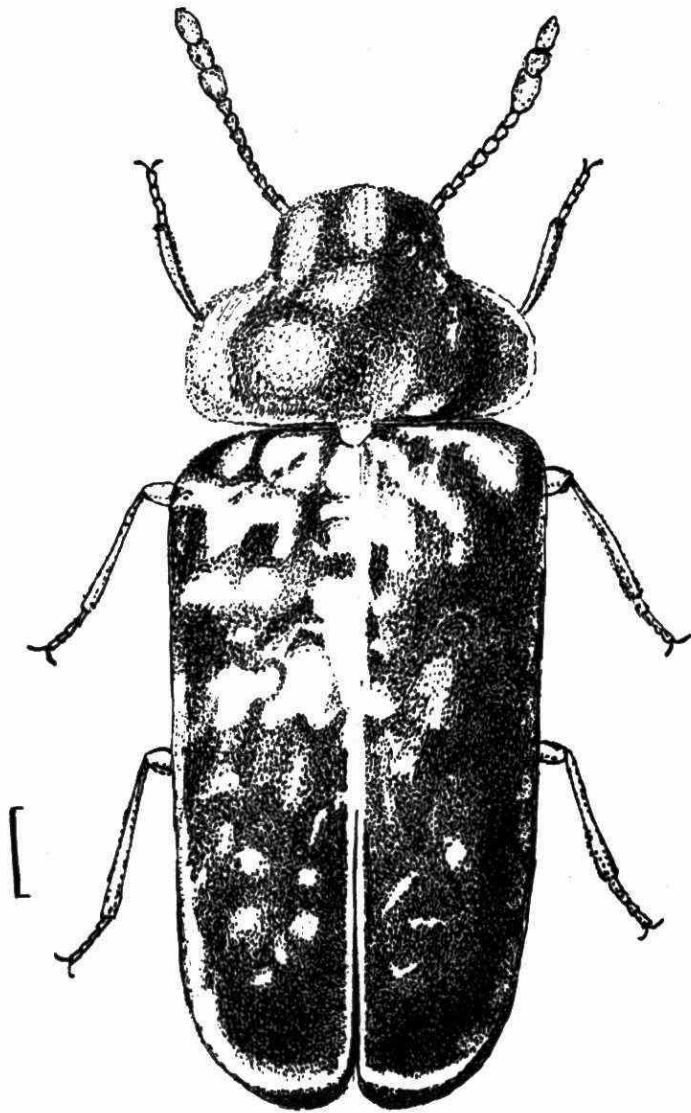


PLATE 28

DEATH WATCH BEETLE

P.K.M. 10/10/72 .

DEATH WATCH BEETLE
Xestobium rufovillosum

Common Name: death watch beetle

Size: Adult, 7 mm long
Larva, 11 mm long

Appearance: - adult, reddish brown to dark brown with patches of short yellow-grey hair
- bangs head to produce a tapping sound when mating
- protum is large, helmet shaped with large lateral flanges
- larva, creamy white, strongly hook shaped
- 2 black spots on each side of head
- covered with short erect golden hairs

Life Cycle: - metamorphosis complete
- eggs are laid on surface of rough wood
- average number of eggs 40 to 60
- larval stage may last 3 years
- pupal stage 2 to 3 weeks
- life cycle may be 4 to 5 years at least

Habits: - normally dwells outdoors in dead and decaying wood
- will attack wooden structures
- damage is done by the larva

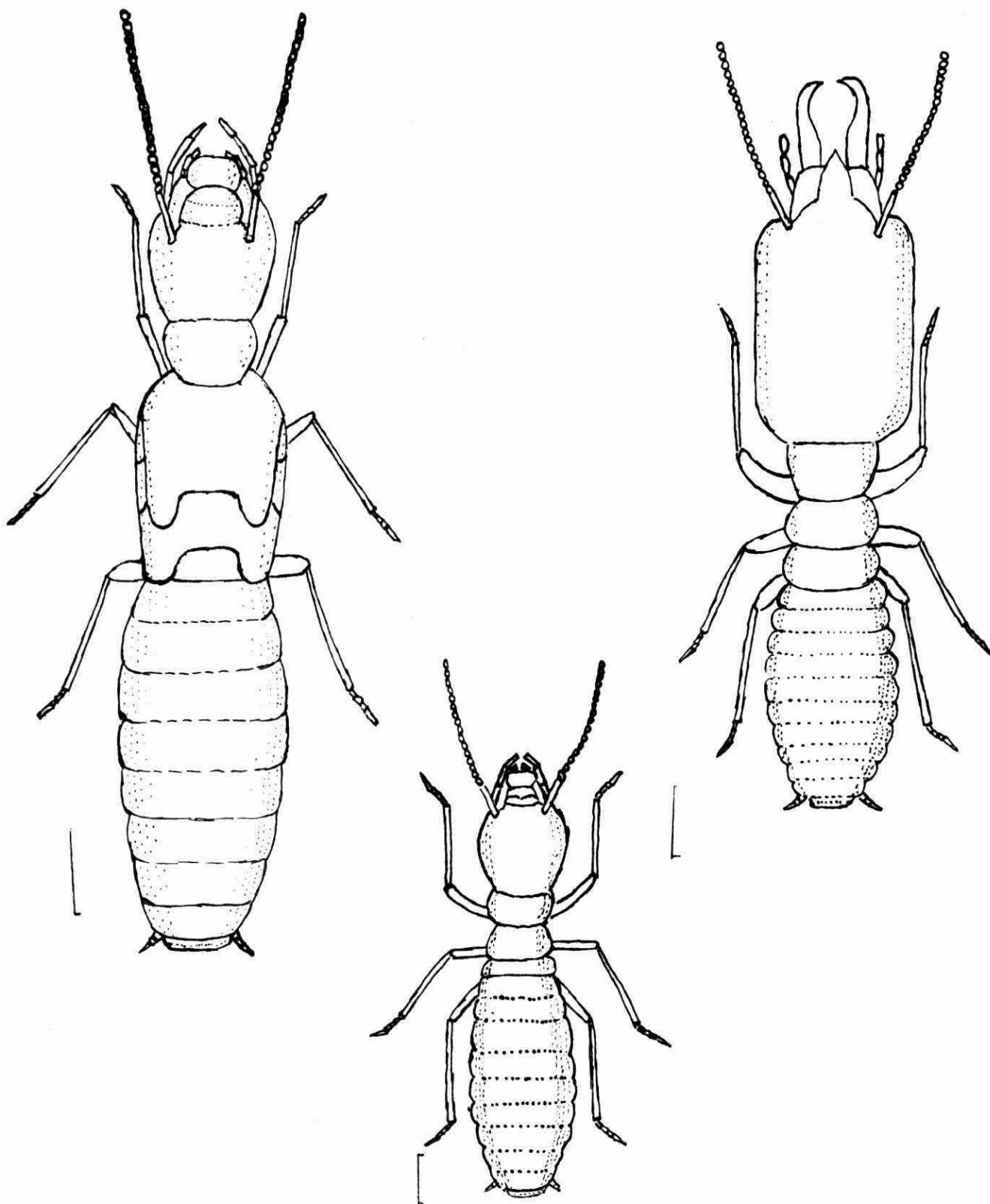


PLATE 29

EASTERN SUBTERRANEAN TERMITE

R.K.M. 10/10/72

PLATE 30

WINGED EASTERN SUBTERRANEAN TERMITE

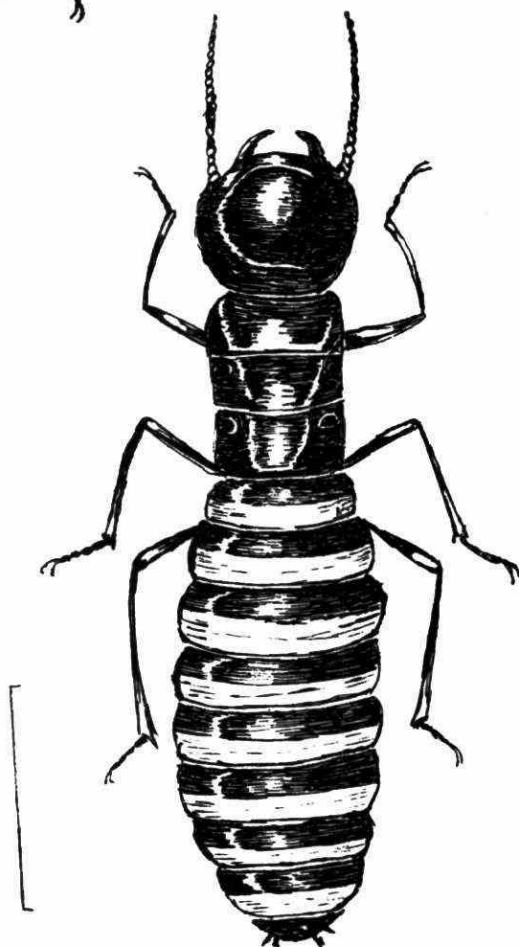
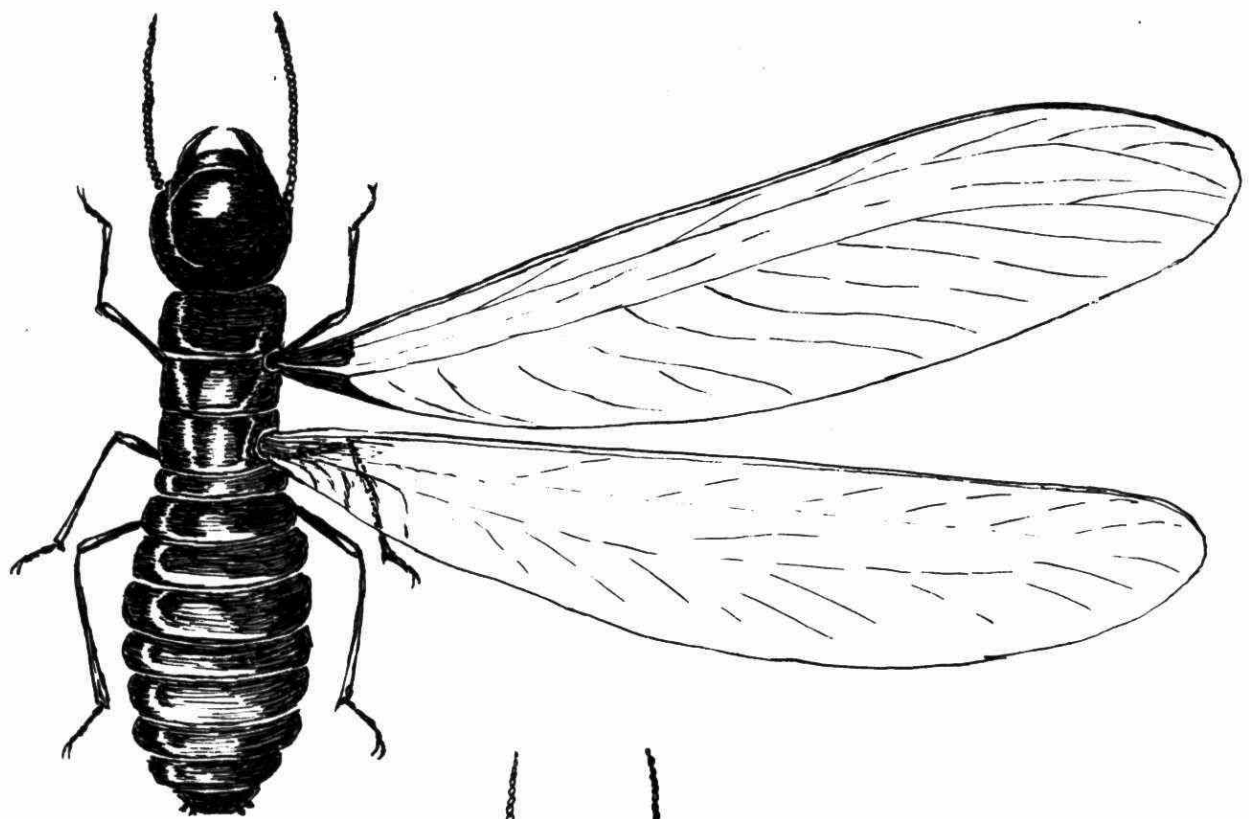


PLATE 30

WINGED EASTERN SUBTERRANEAN TERMITE

R.K.M. 10/10/72

EASTERN SUBTERRANEAN TERMITE
Reticulitermes flavipes

Common Name: eastern subterranean termite

Size: Queen, 1 to 1½ inches long
 Alternate Queen, 5/8 to 3/4 inches long
 Soldier, 3/8 to 3/4 inches long
 Worker, 1/8 to 1/2 inches long

Appearance: - queen, light brown with brown leathery legs
 - after continuous egg laying, abdomen enlarges
 - extended areas, semi transparent
 - alternate queen, semi transparent with light brown mandibles and eyes
 - abdomen enlarges with reproduction
 - soldier, semi transparent, head, light brown
 - head twice as long as body
 - extremely strong forcep like mandibles for fighting
 - wingless
 - worker, semi transparent with light brown mandibles and eyes
 - wingless

Life Cycle: - metamorphosis incomplete
 - winged male and female leave nest usually prior to first rains to breed
 - when female is impregnated, both return to nest and bite off wings and continue breeding and egg laying
 - alternate queens are produced to continue egg production when required by death or incapacitation of queen
 - eggs are laid in a nest in the soil
 - eggs hatch into nymphal stage, then to adult
 - adults are workers, soldiers, kings, queens and alternate queens

Habits: - attacks wooden structures and lumber products
 - will also damage living trees, shrubbery, flowers and crops
 - damage is done by the nymph and the worker

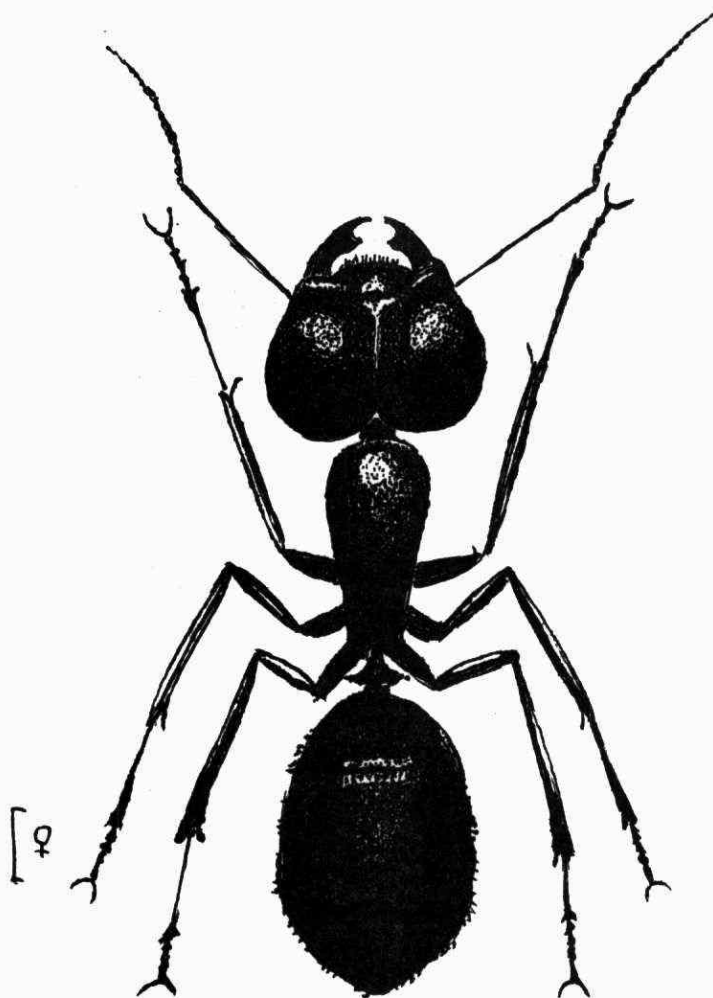
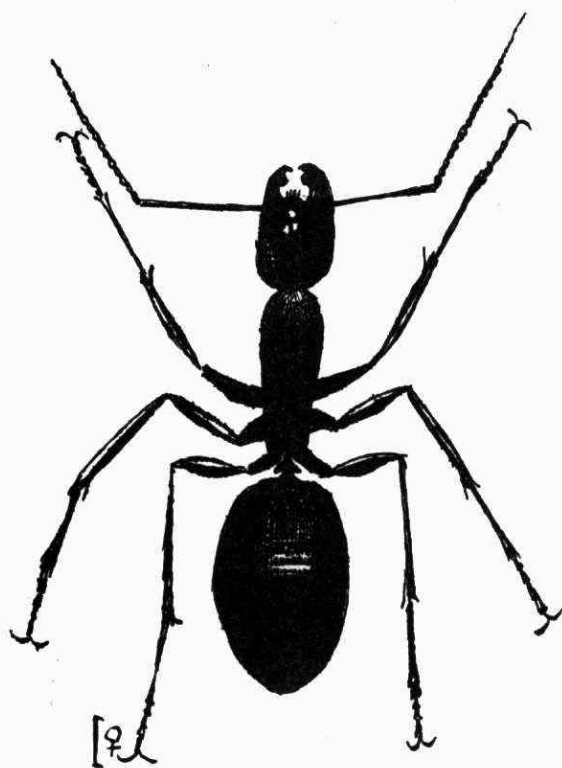
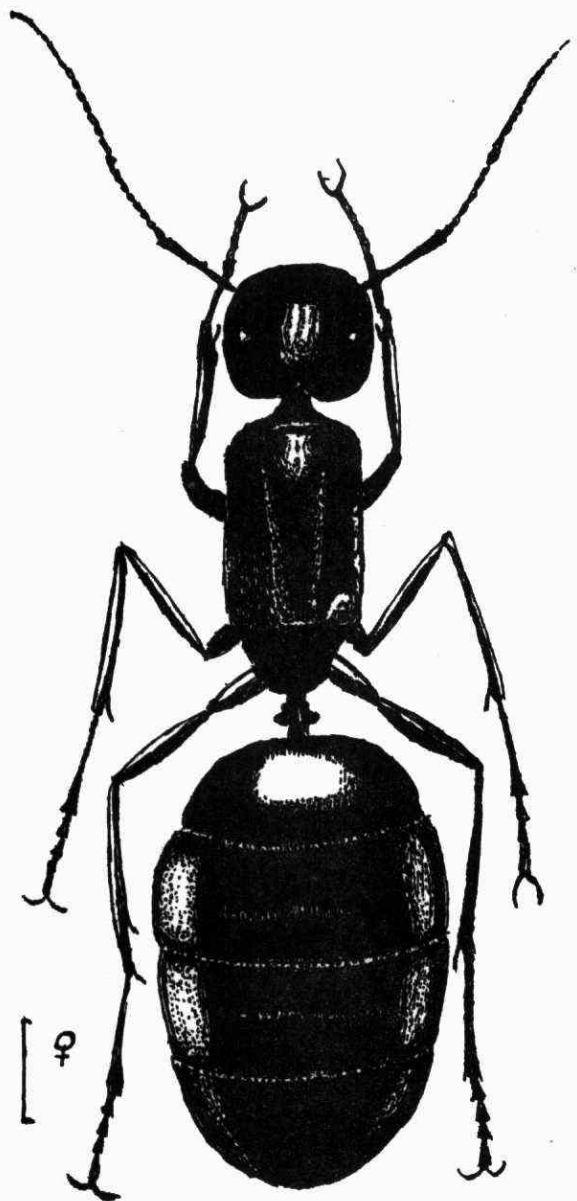


PLATE 31
CARPENTER ANT

R.K.M. 11/10/72

CARPENTER ANT
Camponotus pennsylvanicus

Common Name: carpenter ant

Size: Queen, 13 to 15 mm long
Worker, 6 to 10 mm long
Soldier, 6 to 10 mm long

Appearance: - queen, brown or black
- larger than rest of colony
- bites off wings after mating
- only ant in colony laying eggs
- worker, brown or black
- wingless
- sterile females
- have mandibles for chewing
- soldier, brown or black
- larger than workers
- large strong mandibles
- wingless
- large heads

Life Cycle: - metamorphosis complete
- eggs are laid by the queen
- eggs hatch in 24 days
- larval stage is 21 days
- pupal stage is 21 days

Habits: - dwell in and excavate wood
- homes near wooded areas are most likely to become infested
- damage is done by the worker
- also found in forests and lawns
- they will bite

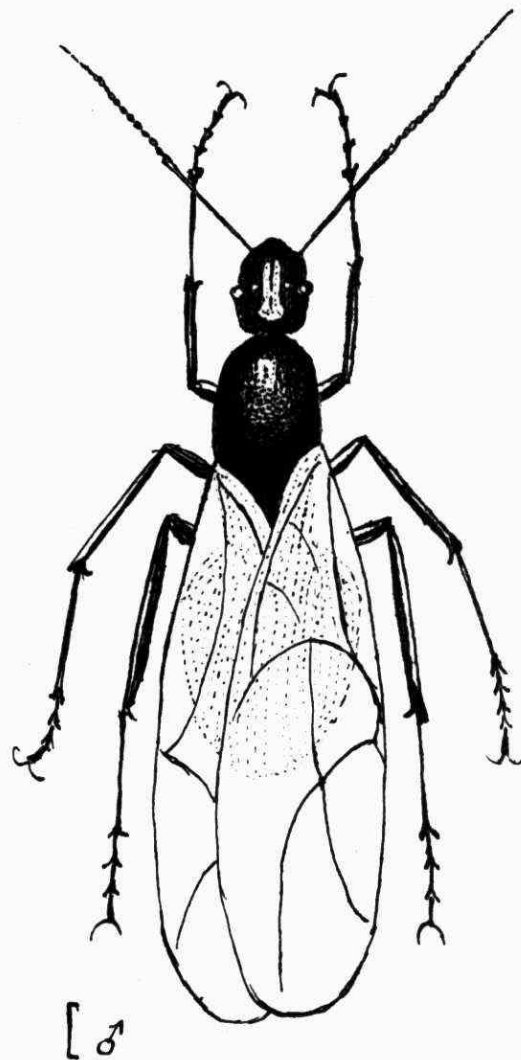
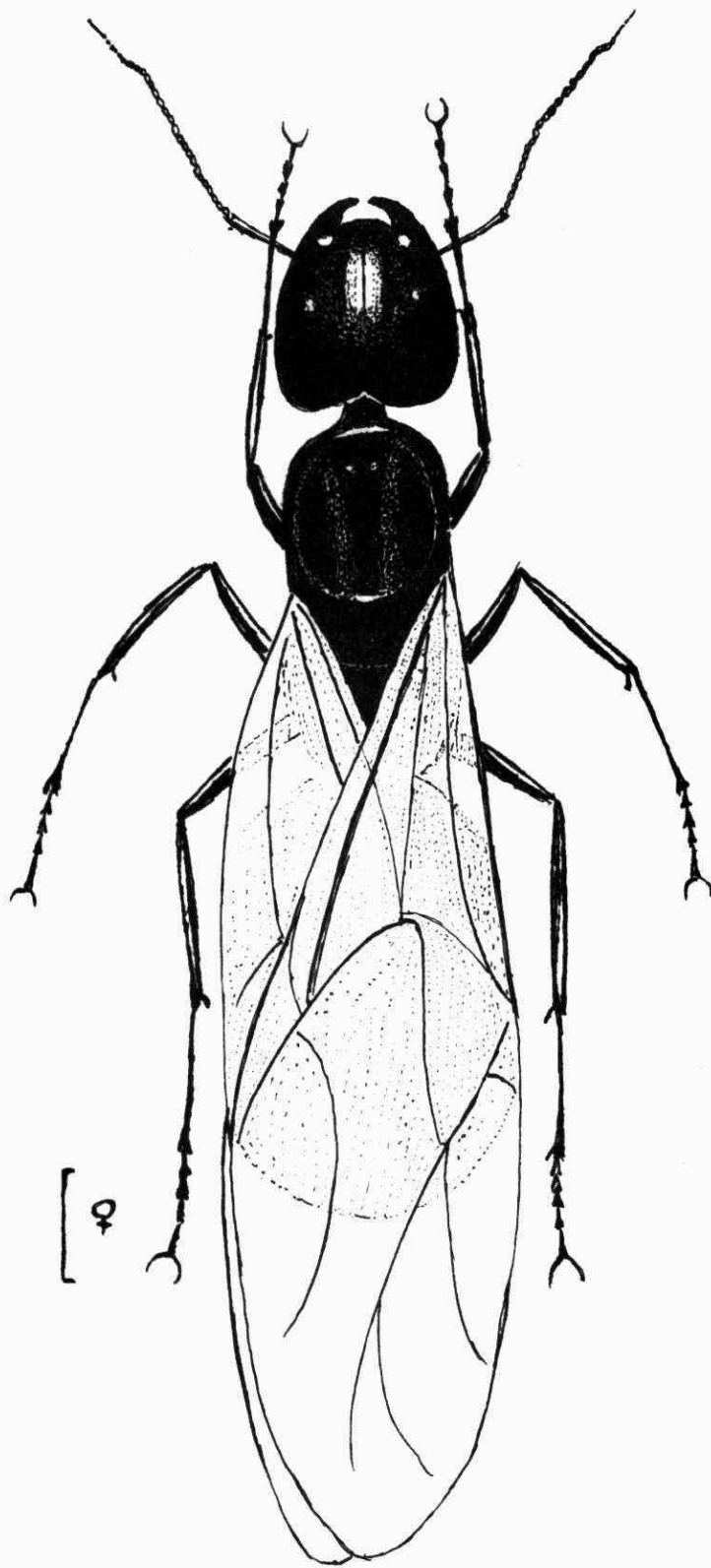


PLATE 32
WINGED CARPENTER ANT

R.K.M. 11/10/72

CARPENTER ANT

Camponotus pennsylvanics

Common Name: carpenter ant

Size: Winged Queen, 13 to 15 mm long
Winged Male, 6 mm long (approx.)

Appearance: - queen, brown or black
- winged
- has mandibles
- male, brown or black
- winged
- smallest of ant colony
- very short life span
- worker, brown or black

Life Cycle: - metamorphosis complete
- eggs are laid by the queen
- eggs hatch in 24 days
- larval stage is 21 days
- pupal stage is 21 days

Habits: - dwell in and excavate wood
- homes near wooded areas are most likely to become infested
- damage is done by the worker
- also found in forests and lawns
- they will bite

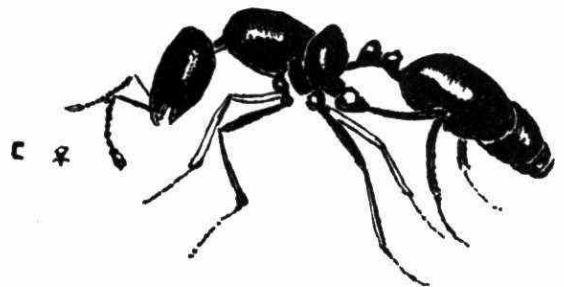
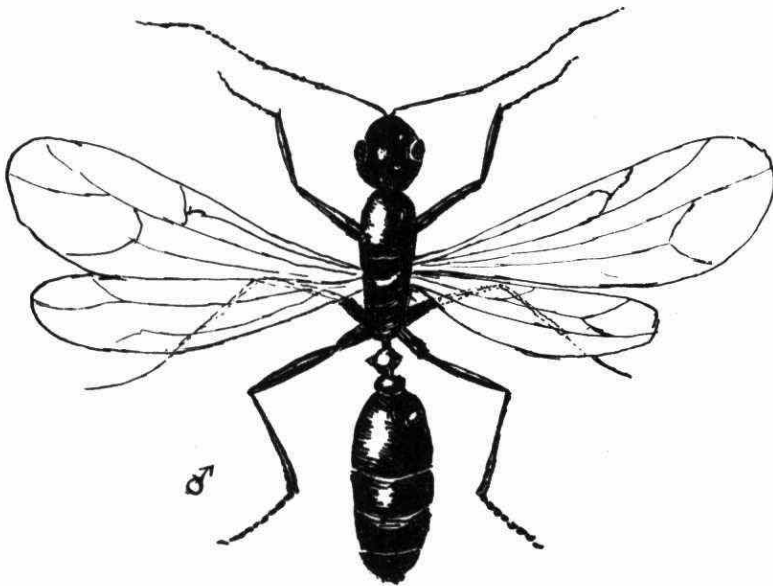
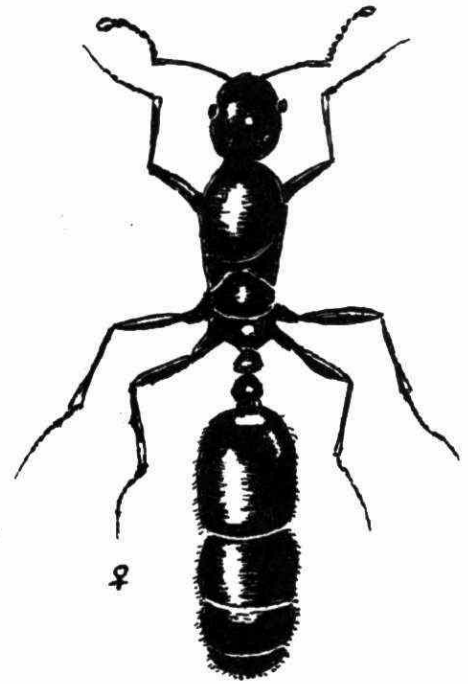
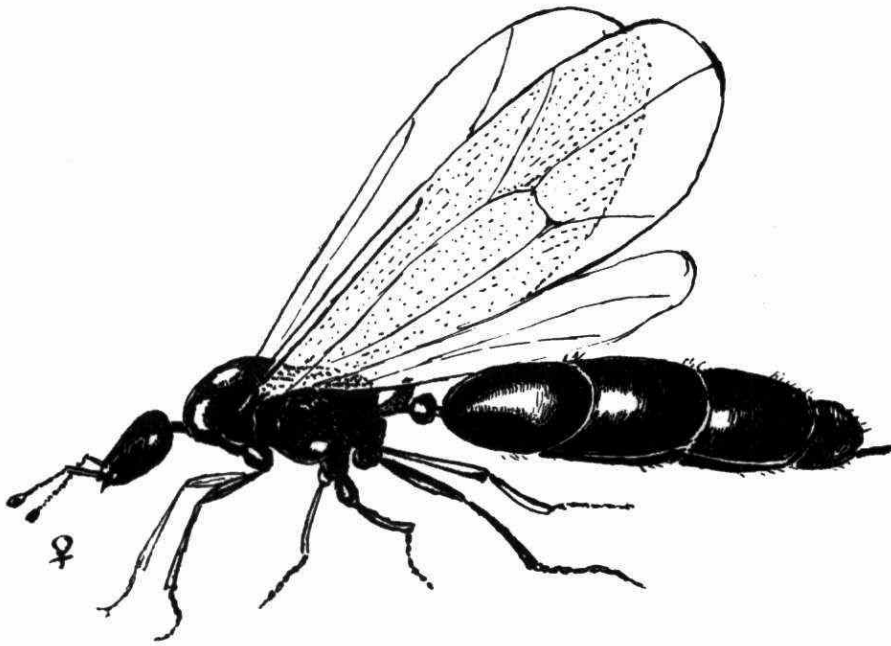


PLATE 33
LITTLE BLACK ANT

LITTLE BLACK ANT
Monomorium minimum

Common Name: little black ant

Size: Adult, 1.5 mm long

Appearance: - jet black colour
 - male winged
 - female winged until after mating
 - workers wingless

Life Cycle: - metamorphosis complete
 - female or queen may lay thousands of eggs in her lifetime
 - queen may live from 1 to 15 years
 - after mating queen bites off her wings and goes into the colony to lay her eggs
 - she never leaves the colony again
 - workers are sterile females

Habits: - dwells beneath rocks, in lawns or in areas free of vegetation
 - feeds on honey dew and sweet plant secretions
 - will occasionally invade the home for food

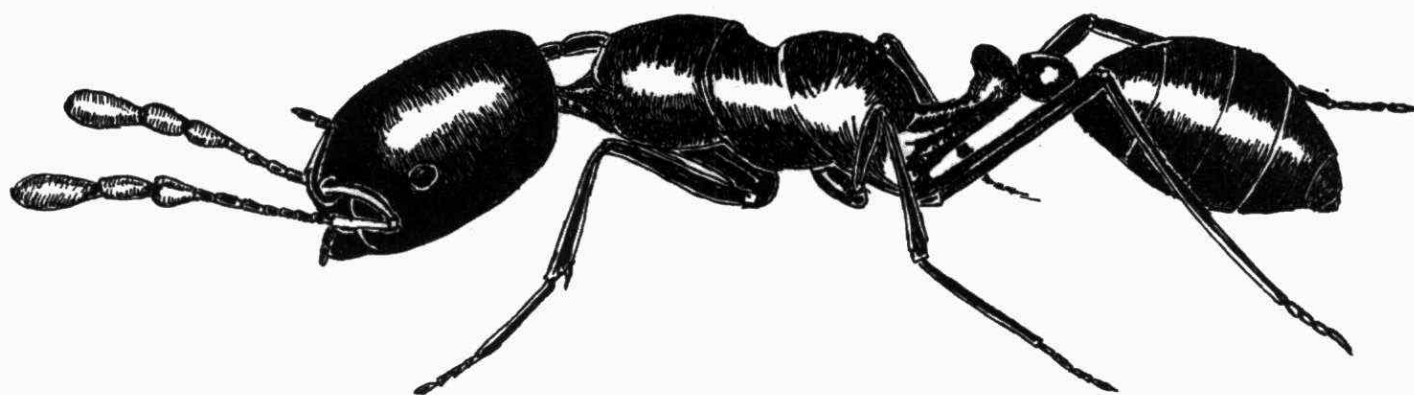


PLATE 34

PHAROAH ANT

R.K.M. 12/10/72

PHAROAH ANT
Monomorium pharaonis

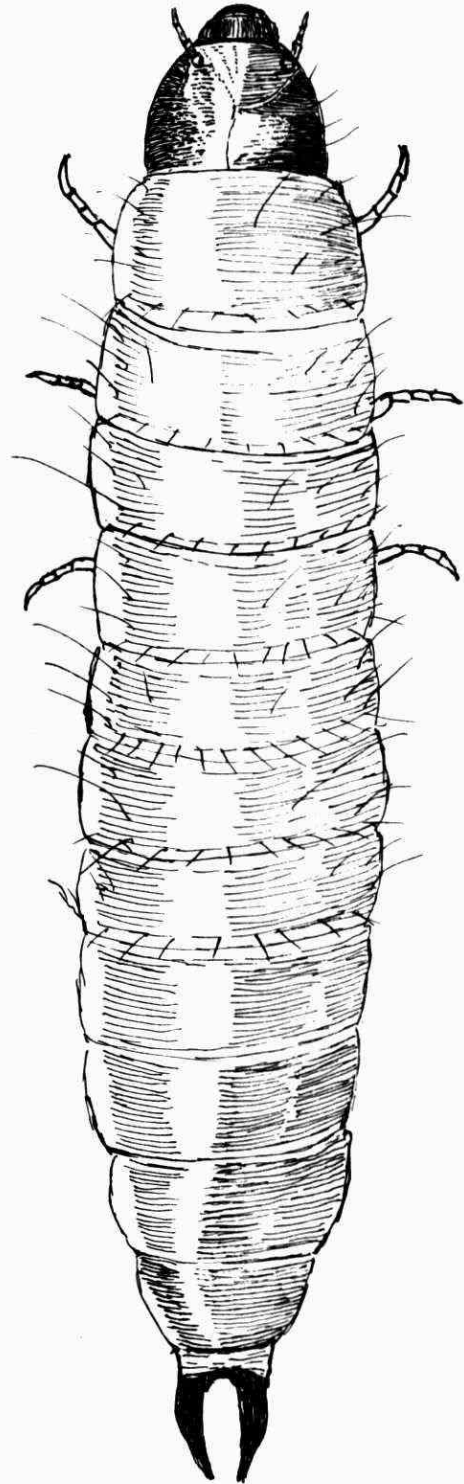
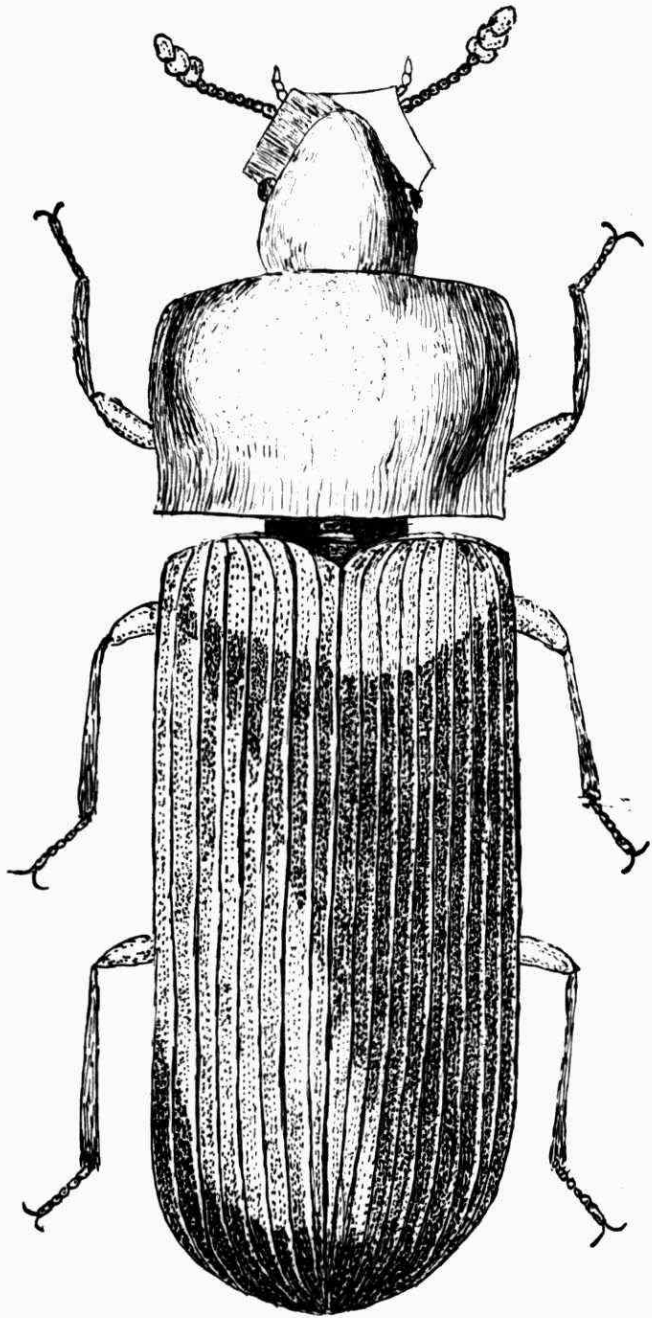
Common Name: pharaoh ant

Size: Adult, 1.5 to 2 mm long

Appearance: - yellow to red in colour
- antennal club has 3 segments
- only sexually mature male and female have wings
- others are workers and wingless

Life Cycle: - metamorphosis complete
- queen may lay up to 300 eggs
- eggs hatch in approximately 7 days
- larval stage lasts about 18 days
- pupal stage lasts about 9 days

Habits: - frequently infests building where foods are stored or handled
- prefers warm places with high humidity
- all kinds of human foods are attacked
- nests are found under floors, within walls behind stoves or in the vicinity of water pipes



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PLATE 35
CONFUSED FLOUR BEETLE

CONFUSED FLOUR BEETLE
Tribolium confusum

Common Name: confused flour beetle

Size: Adult, 3.5 mm long
Larva, .25 inches long

Appearance: - adult, reddish brown
- long flattened oval body
- antennae gradually clublike, with four segments
- larva, white to yellow

Life Cycle: - metamorphosis complete
- female lays 300 to 400 eggs
- eggs hatch in approximately 9 days
- larva instars average 8
- larval stage varies from 22 to over 100 days
- pupal period approximately 8 days
- life cycle varies from 4 weeks on

Habits: - attack and feed on flour and cereal products
- damage is done by the larva and the adult

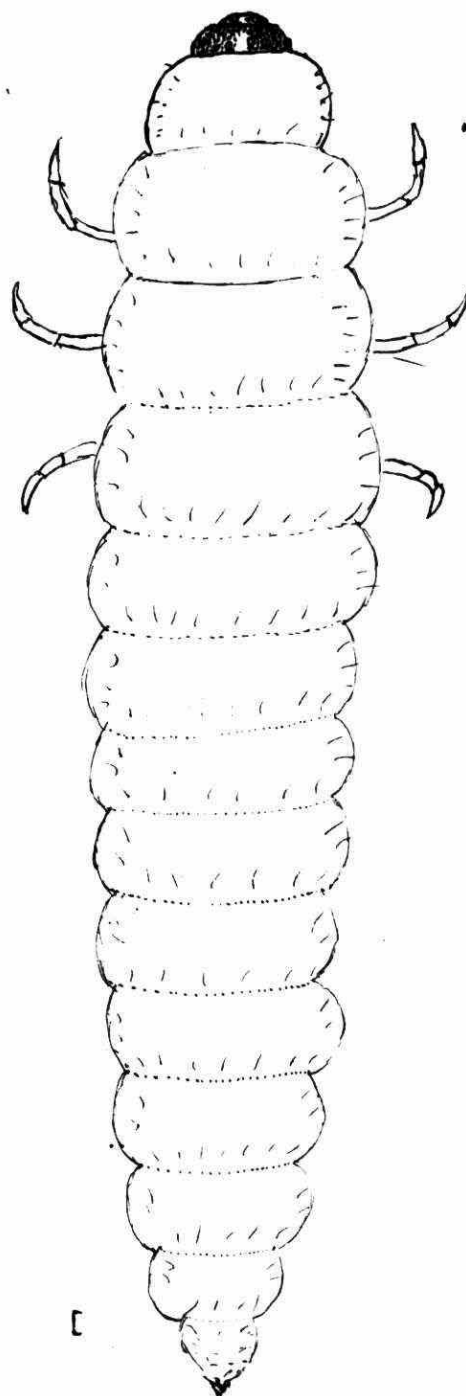
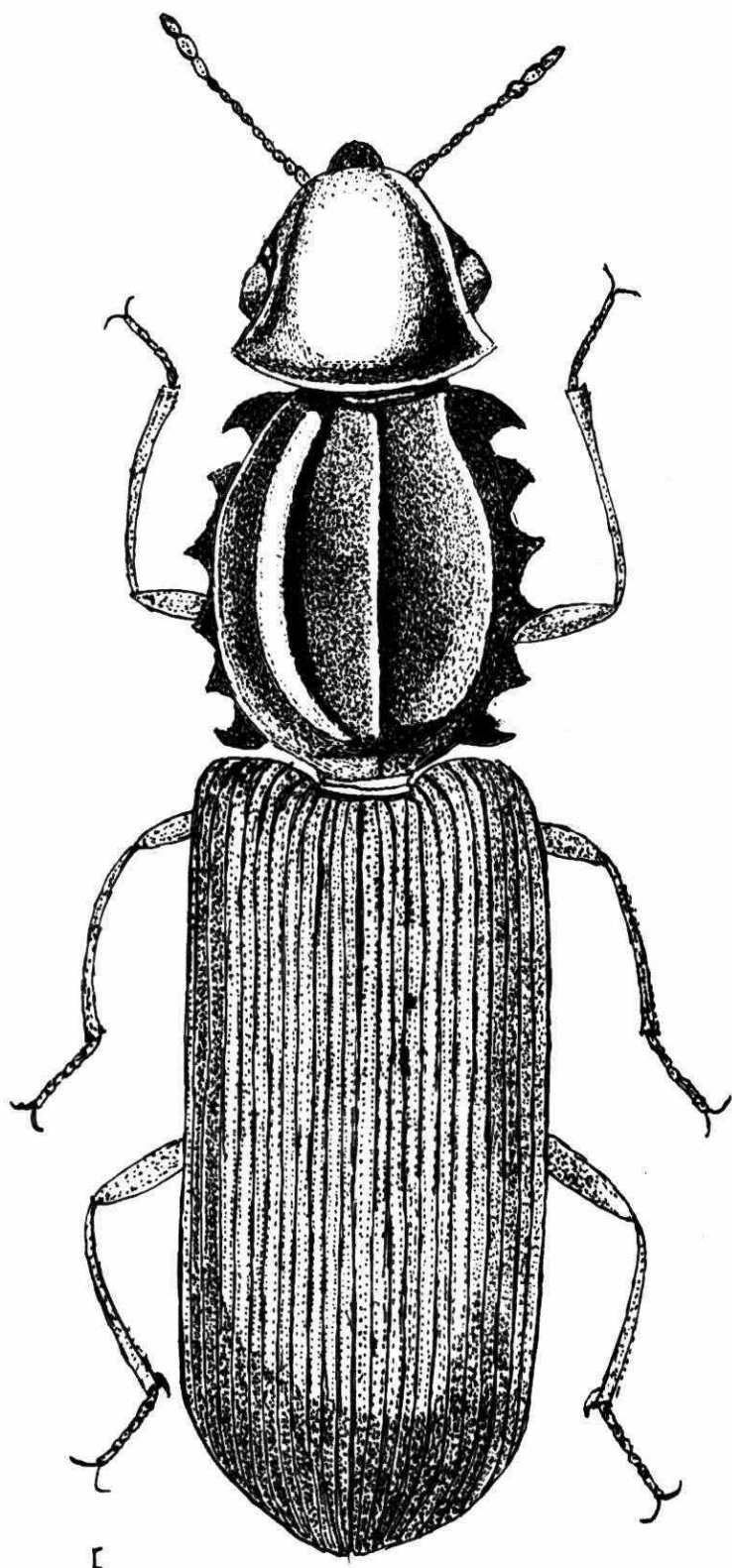


PLATE 36

SAW TOOTHED GRAIN BEETLE

R.K.M. 16/10/72

SAWTOOTHED GRAIN BEETLE
Oryzaephilus surinamensis

Common Name: sawtoothed grain beetle

Size: Adult, 1/10 inch long
Larva, 1/8 inch long

Appearance: - adult, brown
- flattened body
- margins of thorax are saw-like and bear six projections on each side
- male bears a tooth on the femur of hind leg
- larva, yellowish white with a brown head
- three pairs of legs
- one pair of abdominal prolegs

Life Cycle: - metamorphosis complete
- eggs are laid in some crevice in food supply
- female lays 45 to 285 eggs
- eggs hatch in about 1 week
- larva moults 2 to 4 times
- larval period averages 37 days
- pupal stage averages 6 days
- life cycle averages 3 to 4 weeks in homes or in summer

Habits: - attacks a great variety of dried foods
- readily penetrates packaged foods
- damage is done by the larva and the adult

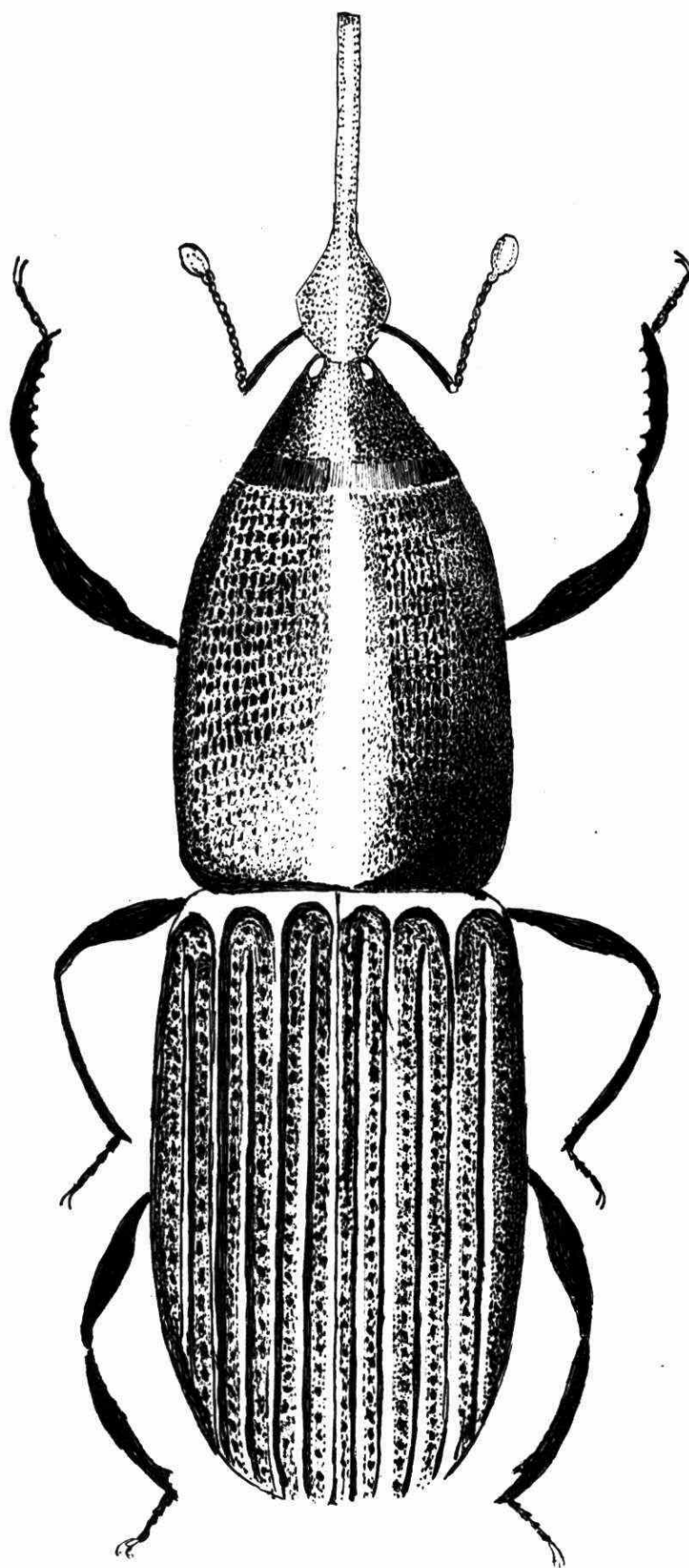


PLATE 37

GRANARY WEEVIL

R.K.M.16/10/72

GRANARY WEEVIL
Sitophilus granarius

Common Name: granary weevil

Size: Adult, 1/8 to 3/16 of an inch long
Larva, small

Appearance: - adult, shiny reddish brown
- male has shorter and wider beak
- more defined punctures on dorsal surface
- elongated pits on thorax
- no spots on wings
- larva, white, legless

Life Cycle: - metamorphosis complete
- female makes a single hole in grain, deposits egg and then plugs up the hole
- female lays 36 to 254 eggs
- larva has 4 instars
- larval stage varies from 19 to 34 days
- pupal stage is from 5 to 16 days
- life cycle 30 to 40 days in summer
- 123 to 148 days in winter

Habits: - attacks grains of all kinds
- damage is done by the larva and the adult

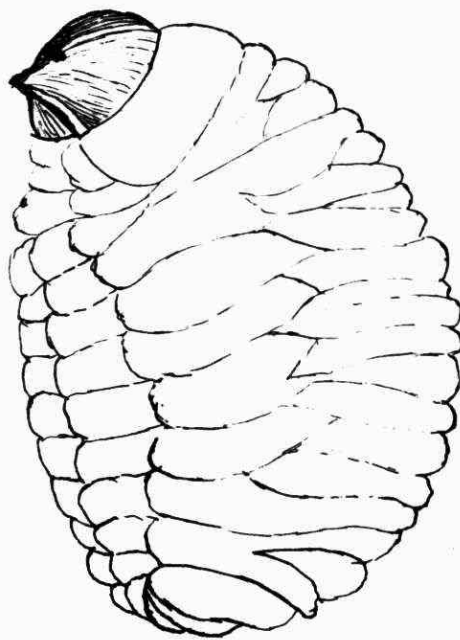
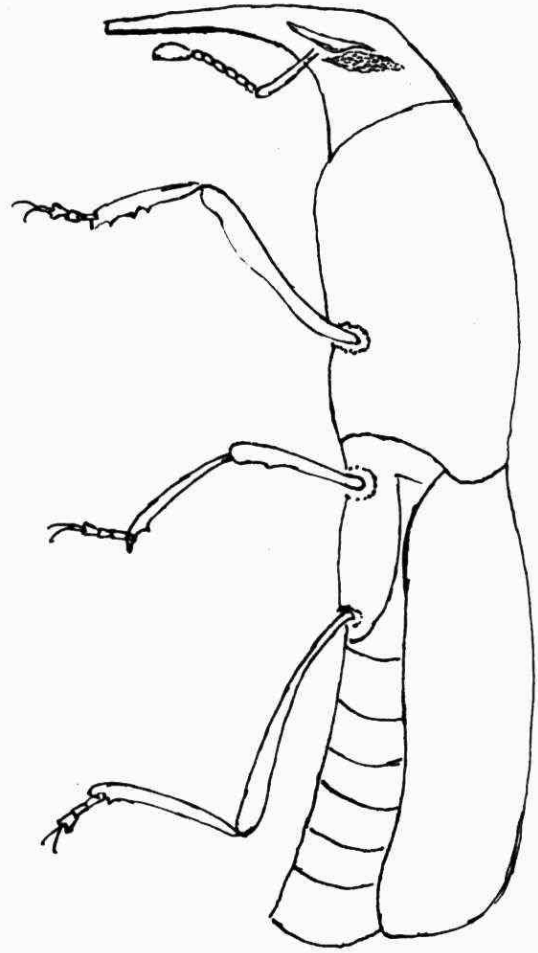
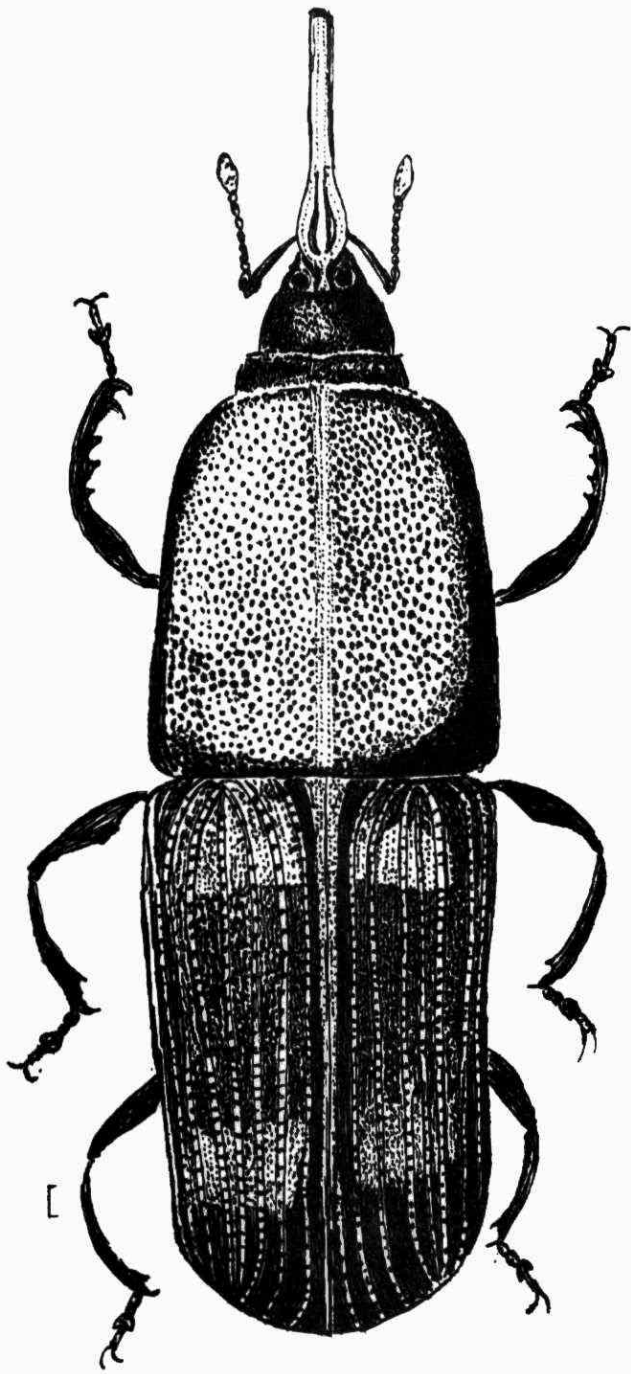


PLATE 38

RICE WEEVIL

R.K.M. 16/10/72.

RICE WEEVIL
Sitophilus oryza

Common Name: rice weevil

Size: 2 mm long

Appearance: - Adult, dull reddish brown
- thorax pitted with deep punctures
- 4 light spots on wing covers
- larva, creamy white with brownish black head

Life Cycle: - metamorphosis complete
- egg is laid in a kernel of grain
- egg hatches in 3 days
- larva has 3 instars
- larval stage averages 18 days
- pupal stage 3 to 9 days
- life cycle averages 32 days

Habits: - attacks grain in the field as well as
stored cereal products
- will also injure apples and pears
- damage is done by the larva and the adult

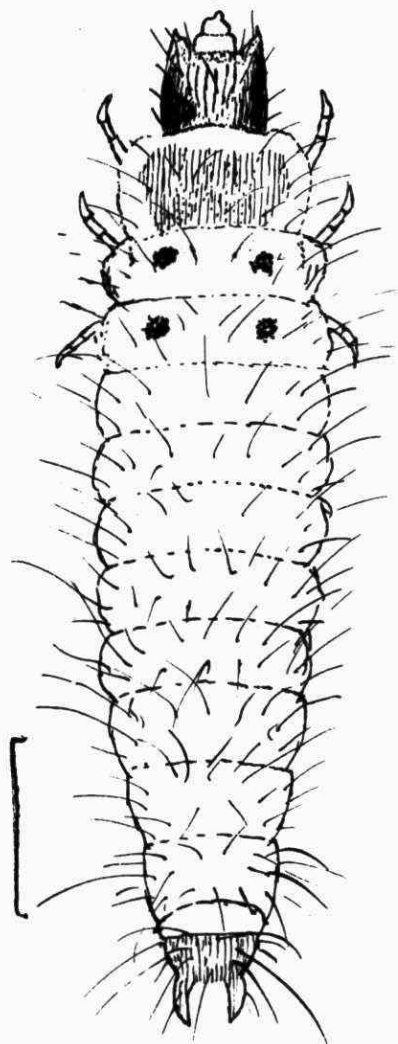
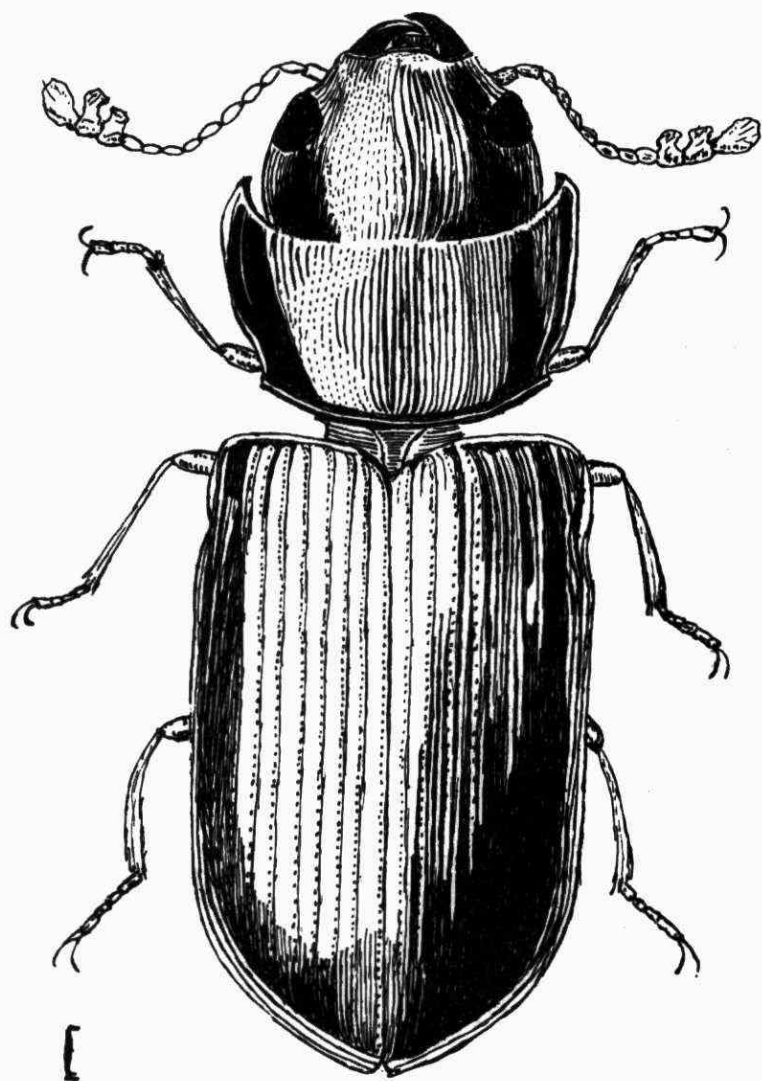


PLATE 39

CADELLE

R.K.M. 16/10/72

CADELLE
Tenebrioides mauritanicus

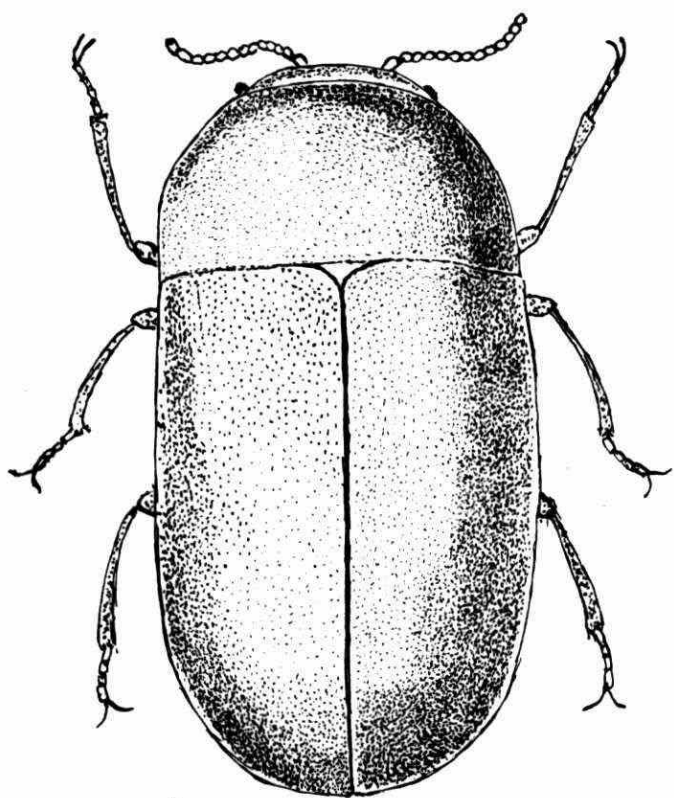
Common Names: cadelle, bread beetle, bolting cloth beetle

Size: Adult, 1/3 inch long
Larva, 1 inch long

Appearance: - adult, shiny black
- males have numerous fine punctures on ventral side of abdomen
- females have less numerous and coarser punctures
- larva, white fleshy grub
- set of dark markings at each end

Life Cycle: - metamorphosis complete
- females may lay from 436 to 1319 eggs
- female deposits eggs in flour and crevices of other food materials
- larval stage lasts 38 to 414 days
- larva averages 4 instars

Habits: - infest rice and flour mills, grain, packages of foods
- will cut the silk bolting in flour mill machinery
- damage is done by the larva and the adult



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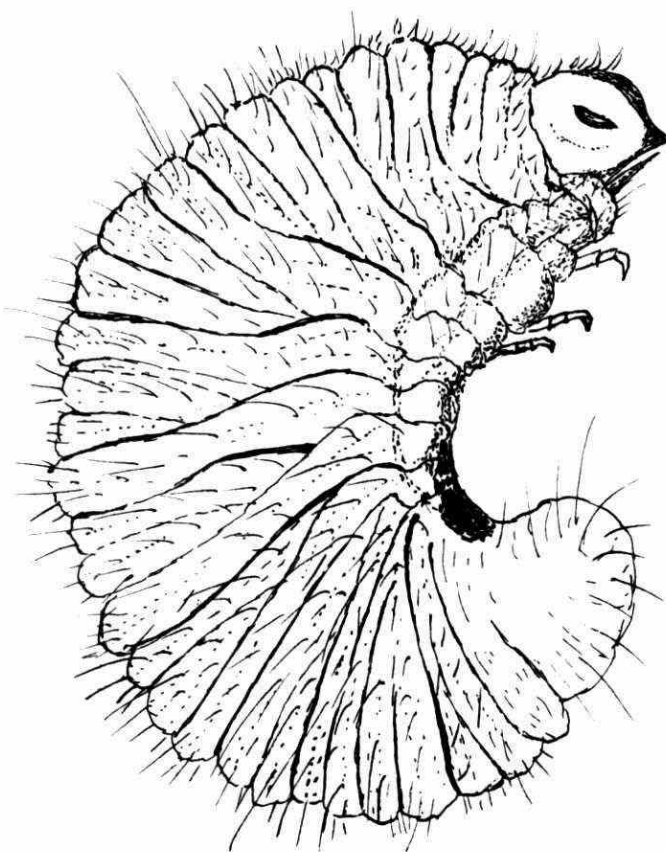
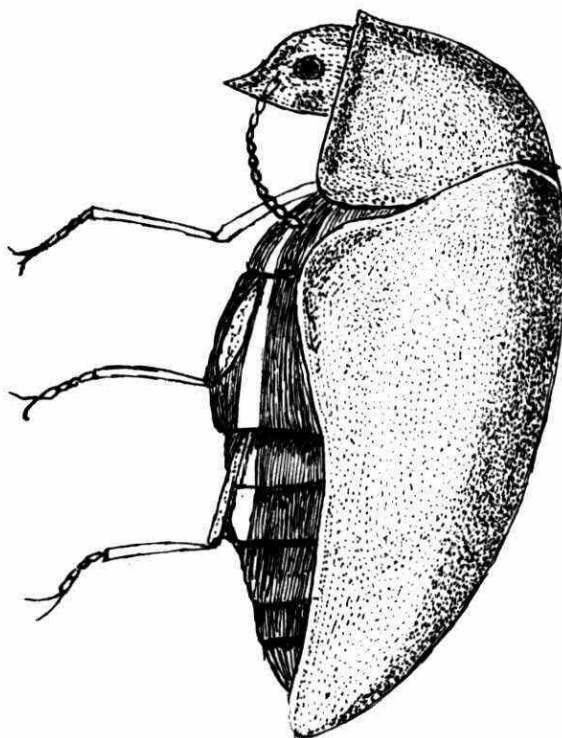


PLATE 40

CIGARETTE BEETLE

R.K.M 17/10/72

CIGARETTE BEETLE
Lasioderma serricorne

Common Names: cigarette beetle, tobacco beetle, herbarium beetle

Size: Adult, 2 to 3 mm long
Larva, 4 to 5 mm long

Appearance: - adult, light brown,
- small squat beetle
- saw-like antennae
- head retracted
- fly readily
- larva, white semi-transparent
- liberally clothed with hairs

Life Cycle: - metamorphosis complete
- eggs are laid in bundled tobacco in storage
- female lays about 30 eggs
- eggs hatch in 6 to 10 days
- larval stage lasts 5 to 10 weeks
- pupal stage lasts 2 to 3 weeks
- life cycle 45 to 50 days

Habits: - infests tobacco wherever it is stored
- will also attack books and furniture upholstered
with flax or straw
- damage is done by the larva and the adult

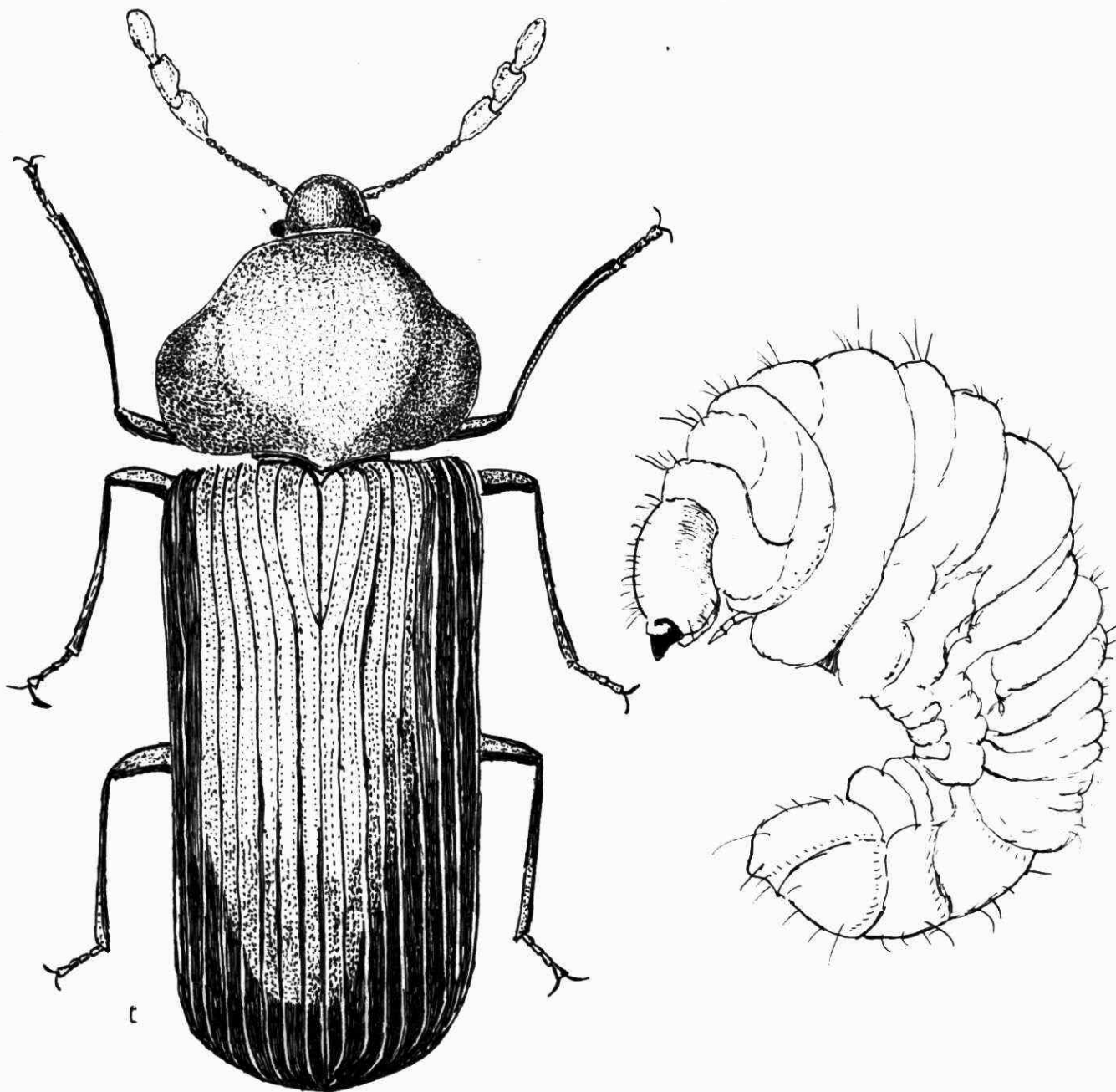


PLATE 41
DRUG STORE BEETLE

DRUG STORE BEETLE
Stegobium paniceum

Common Names: drug store beetle, bread beetle, biscuit beetle

Size: Adult, 1/10 inch long
Larva, less than 1/10 inch long

Appearance:- Adult, uniform light brown
- cylindrical
- body covered with short silky down
- antenna has 3 segmented club
- rounded pronotum completely masks the head
- larva, white
- body covered with silky hairs

Life Cycle:- metamorphosis complete
- female lays about 100 eggs in foods and nearby crevices
- eggs hatch in 12 to 37 days
- larva moults 4 times
- larval stage lasts 4 to 5 months
- pupal stage lasts 21 - 18 days
- life cycle about 6 months in the summer or
in a home

Habits: - attacks stored food products and dried vegetable
matter of many kinds
- it is a serious pest of books and manuscripts
- has even been known to perforate tin foil and sheet lead
- damage is done by the larva

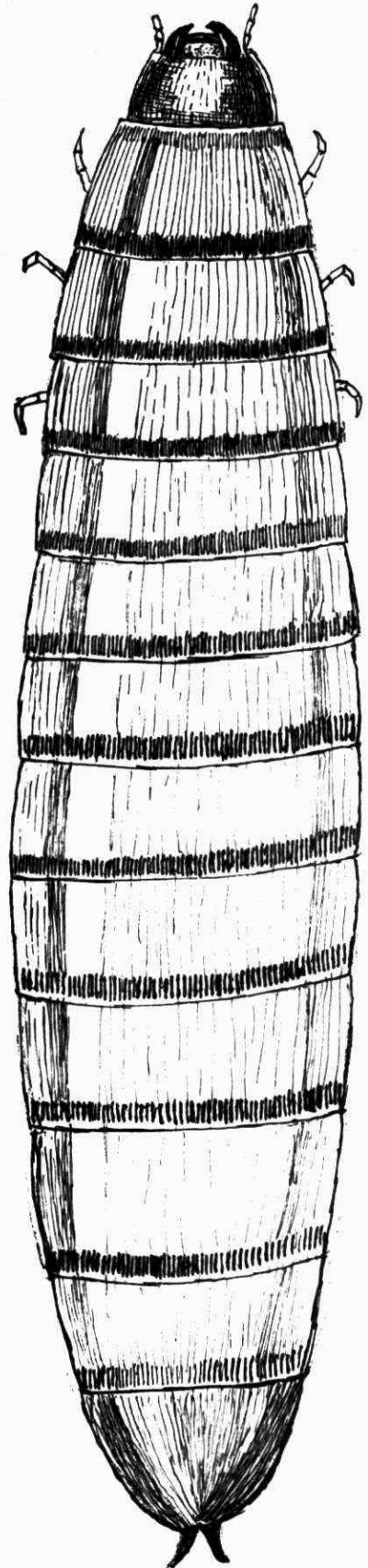
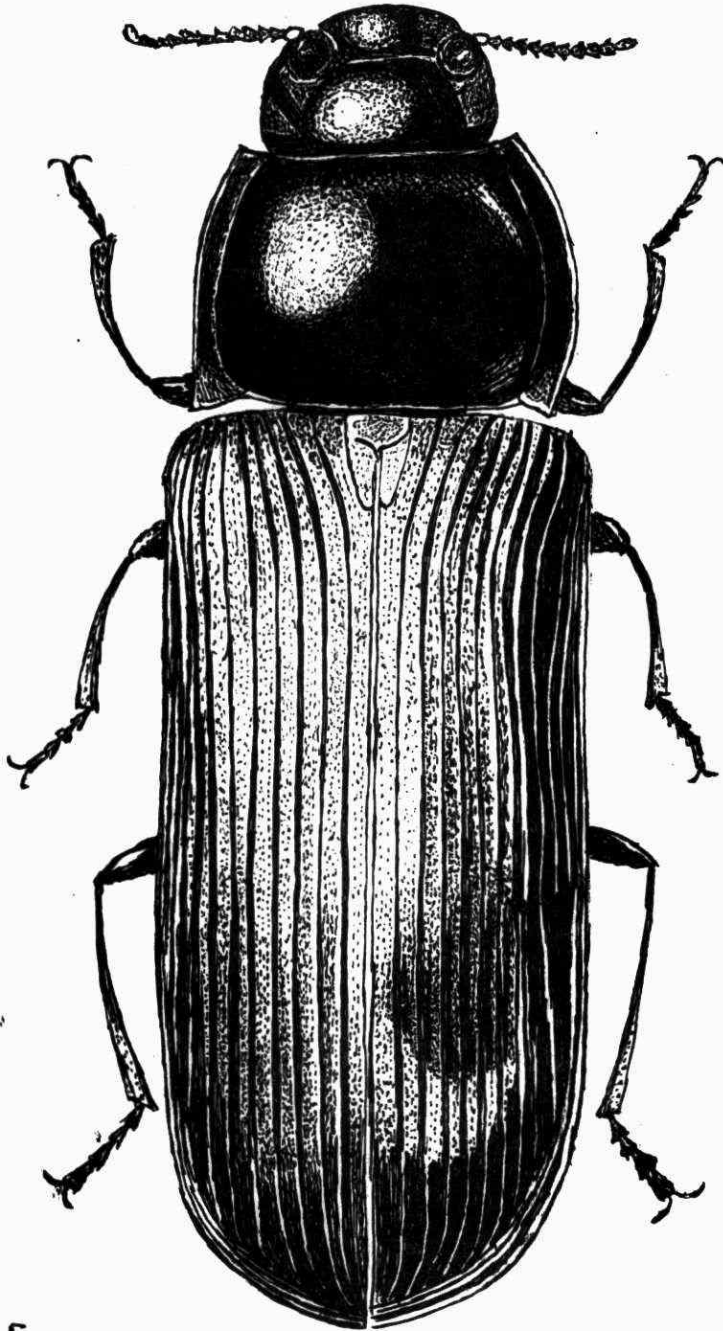


PLATE 42

YELLOW MEALWORM

R.K.M. 17/10/72

YELLOW MEALWORM
Tenebrio molitor

Common Name: yellow mealworm

Size: Adult, .5 inch long
Larva, $1\frac{1}{4}$ inches long

Appearance: - Adult, shiny dark brown to black
- well developed wings
- larva, bright yellow
- 9th abdominal segment has a pair of small dark, upturned spines on dorsal surface

Life Cycle: - metamorphosis complete
- female lays an average of 276 eggs
- eggs are sticky and adhere to flour and other particles
- eggs hatch in about 2 weeks
- larva has 14 or 15 moults
- larval period is more than 600 days
- life cycle is about 1 generation a year in a granary

Habits: - dwell in dark moist places
- infest stored food products
- damage is done by the larva

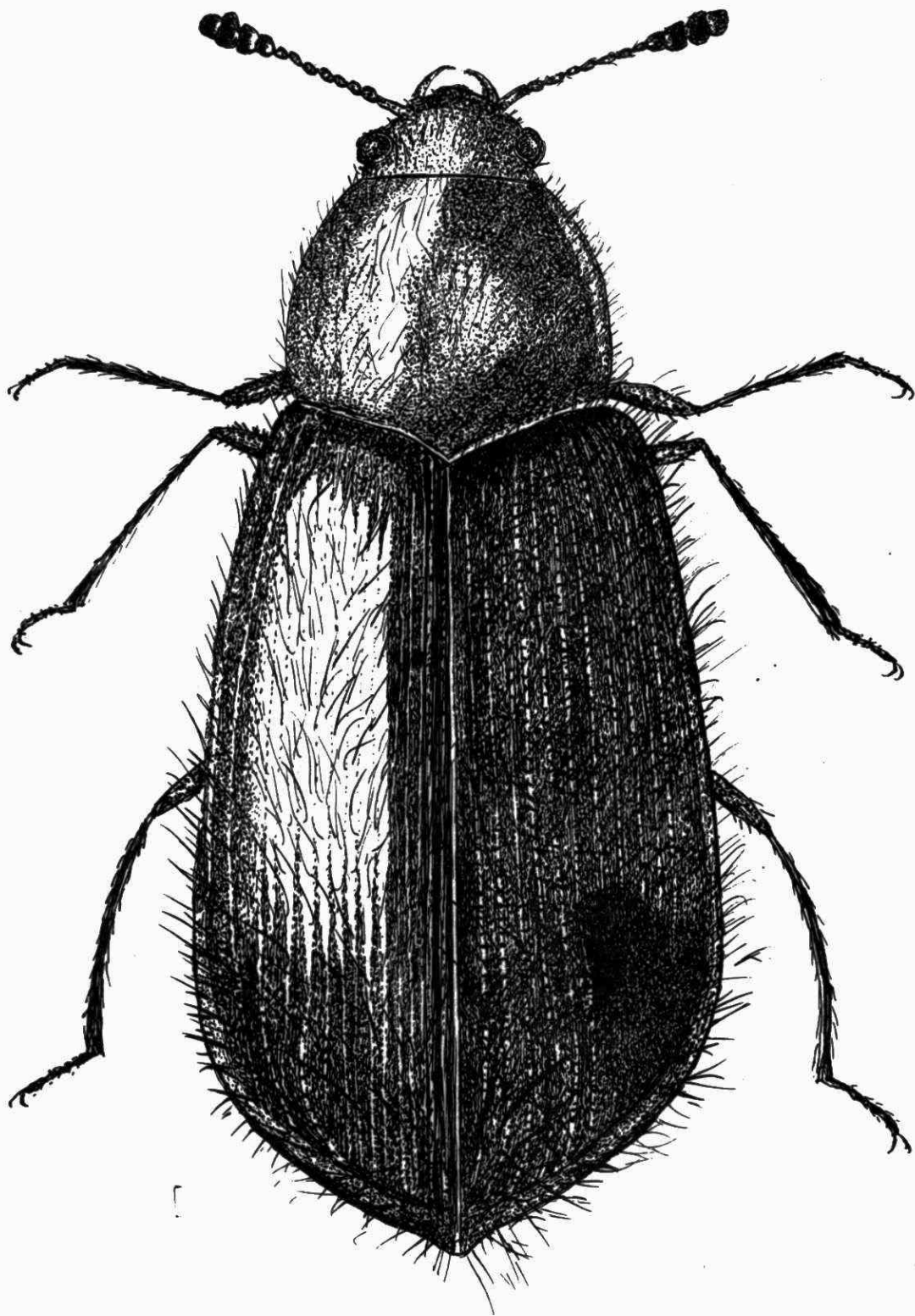


PLATE 43

REDLEGGED HAM BEETLE

R.K.M.18/10, '72

REDLEGGED HAM BEETLE
Necrobia rufipes

Common Name: redlegged ham beetle

Size: Adult, 3.5 to 7 mm long
Larva, 10 mm long

Appearance: - Adult, shiny blue-green colour
- straight sided and noticeably punctured
- legs and base of antenna are reddish brown
- larva, dark brown head
- dorsal thoracic segments

Life Cycle: - metamorphosis complete
- 400 to 2000 eggs are laid on exposed meat
- eggs hatch in 4 to 5 days
- larva bores into the meat
- larva has 2 or 3 instars
- life cycle 36 to 150 days
- adult may live 14 months or more

Habits: - attacks dried or smoked meats, cheese and
any dead or decaying animal matter
- adults are surface feeders
- larva bores into the foods
- insect infests baled cotton, woolen tops,
- rattan and salt, but does not feed on them

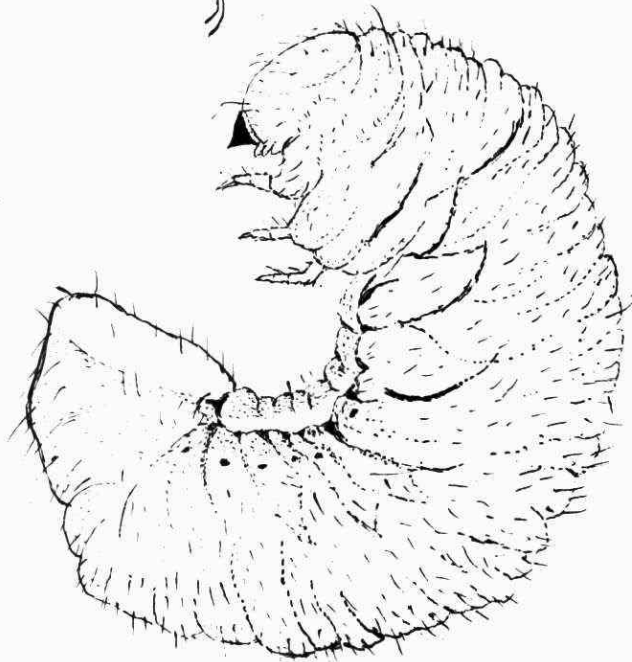
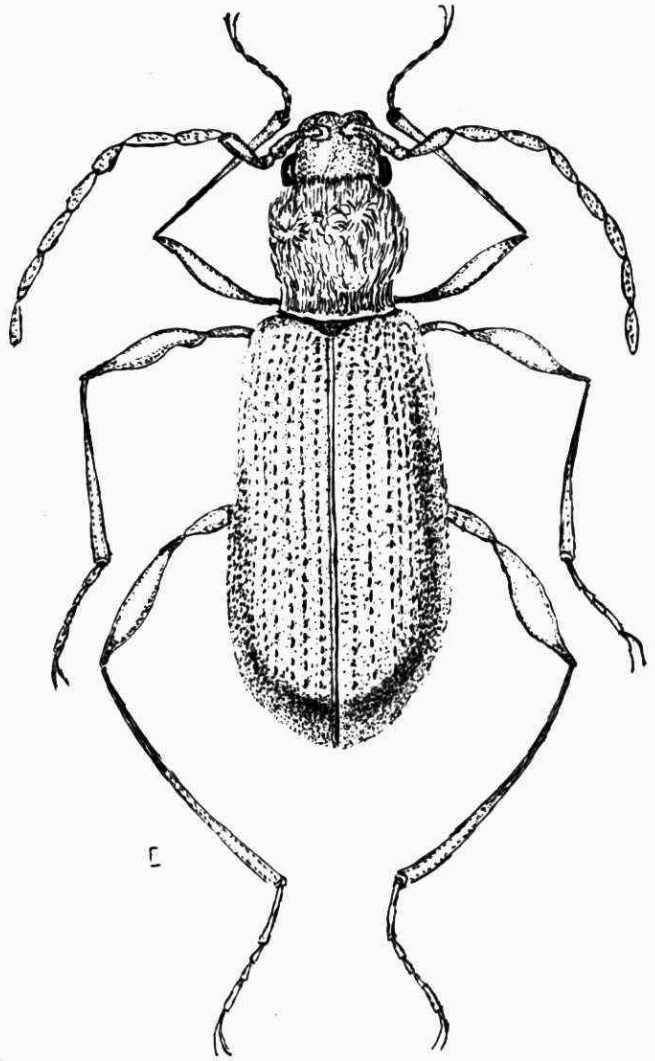
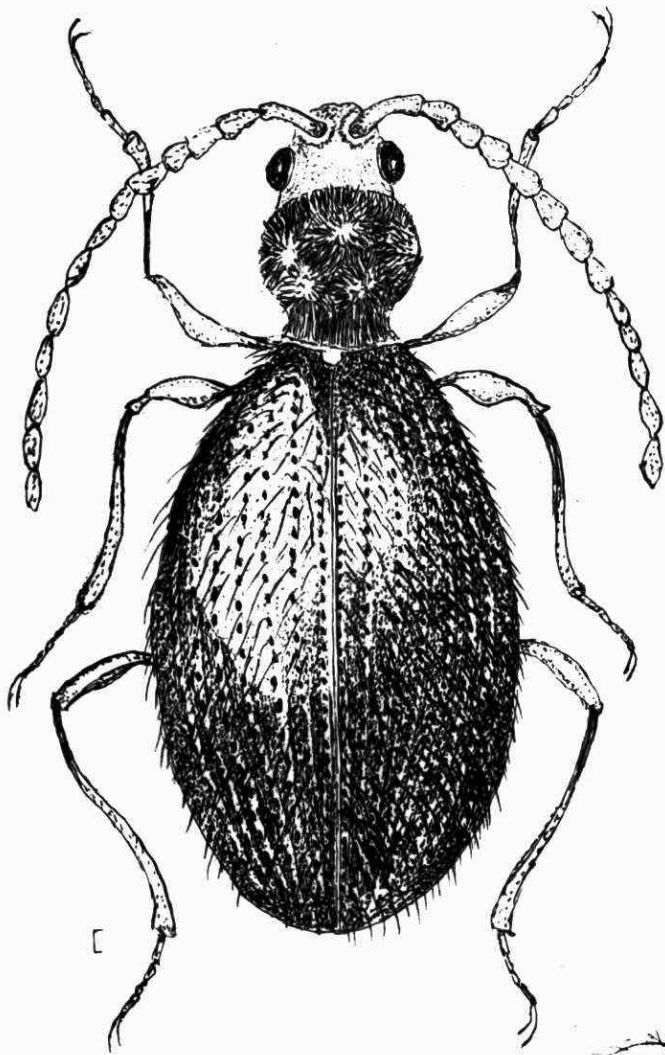


PLATE 44

BROWN SPIDER BEETLE

BROWN SPIDER BEETLE
Ptinus brunneus

Common Name: brown spider beetle

Size: Adult, 2.3 to 3.2 mm long

Appearance: - adult, uniformly brown colour

Life Cycle: - metamorphosis complete

Habits: - found in cellars, attics, storehouses, henhouses etc.
 - feeds on books, feathers, skin and other dried food
 products.

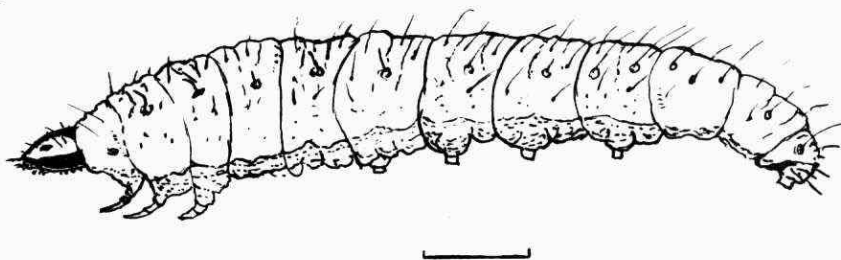
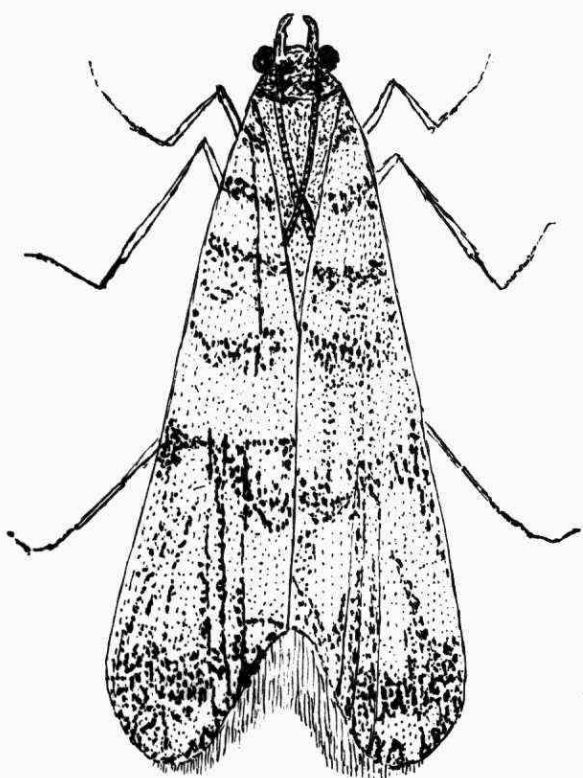
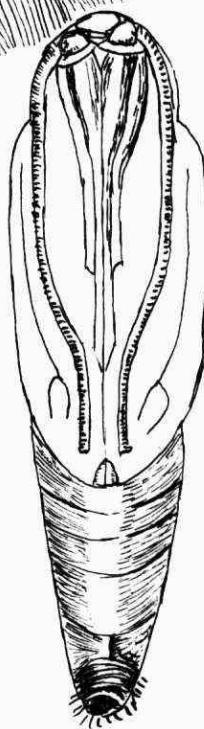
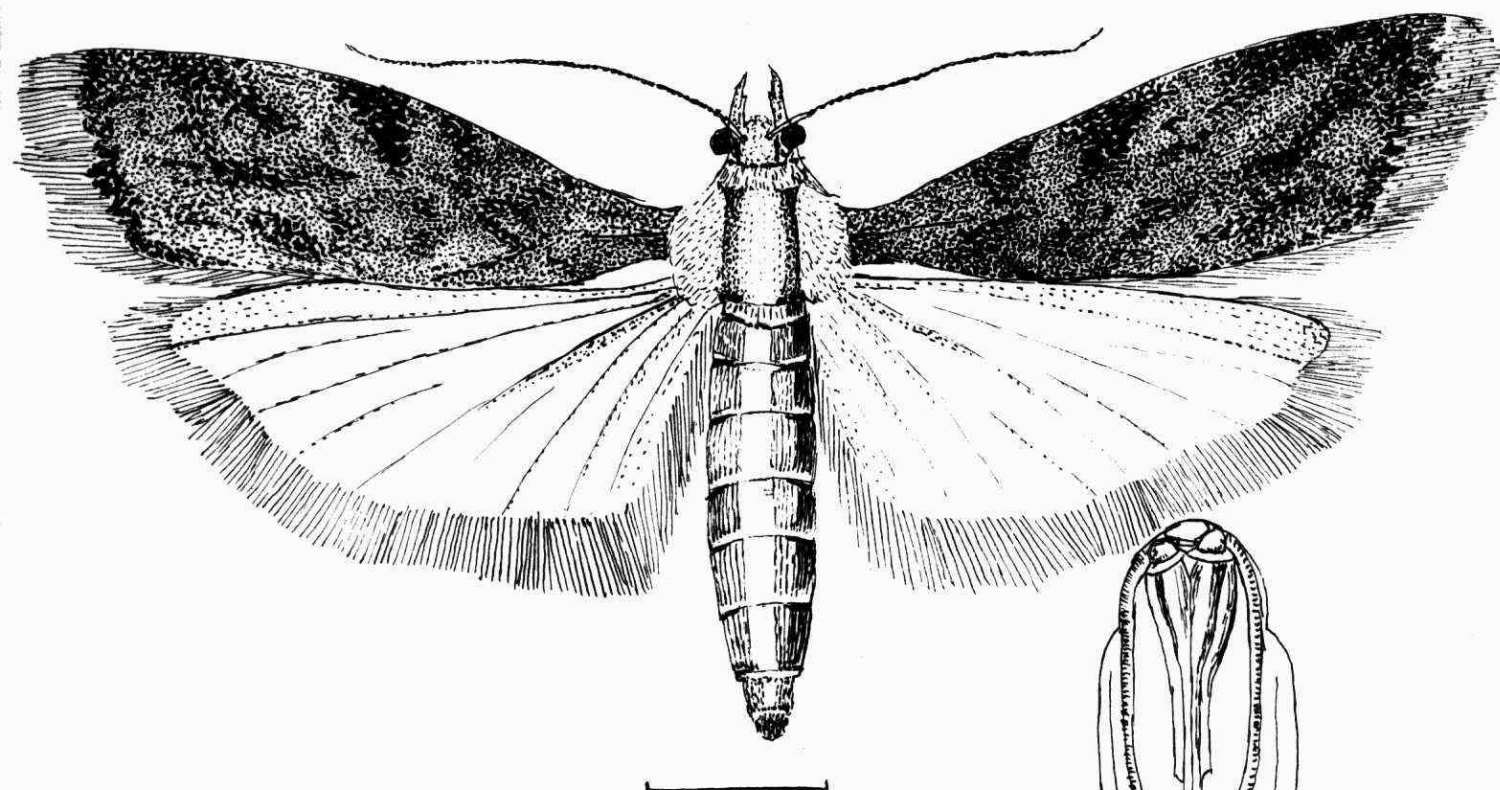


PLATE 45

MEDITERRANEAN FLOUR MOTH

R.K.M. 19/10/72

MEDITERRANEAN FLOUR MOTH
Ephestia (anagasta) kuehniella

Common Name: mediterranean flour moth

Size: Adult, wingspread about 1 inch
 Larva, .5 to .63 inches long

Appearance: - wings are pale grey with transverse wavy bars
 - forewings darker than hind wings
 - hind legs dirty white
 - raises forepart of body when resting giving
 giving wings a distinct slope
 - night flying insect
 - larva, whitish or pinkish
 - head reddish brown

Life Cycle: - metamorphosis complete
 - eggs are where food for larva occurs
 - female lays 116 to 678 eggs
 - eggs may hatch in 3 days
 - larva completes growth in 40 days
 - life cycle 1 to 1½ months

Habits: - attacks flour and stored foods of many kinds
 - damage is done by the larva

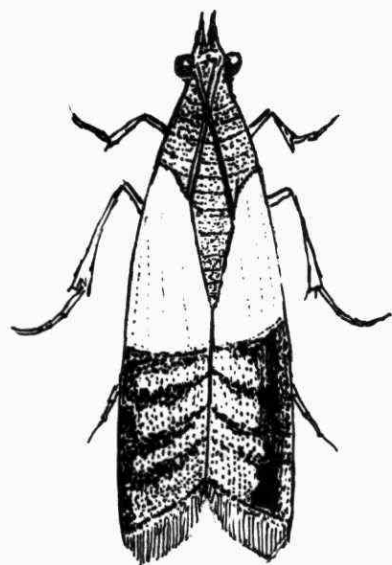
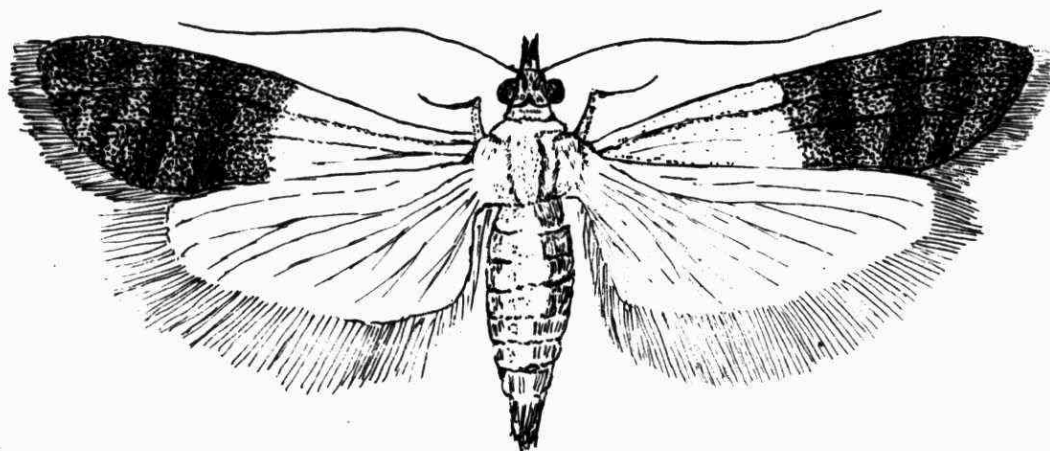


PLATE 46

INDIAN MEAL MOTH

R.K.M. 19/10/72

INDIAN MEAL MOTH
Plodia interpunctella

Common Names: indian meal moth, dried fruit moth

Size: Adult, 5/8 inch wing spread
Larva, 9 to 19 mm long

Appearance: - adult, bronzy appearing wings
- greyish band across wings
- general feeders
- larva, dirty white
- colour changes depending on food consumed

Life Cycle: - metamorphosis complete
- female lays from 200 to 400 eggs
- larval stage ranges from 13 to 288 days
- life cycle ranges from 27 to 305 days

Habits: - basically attacks dried fruit products
- also attacks grain and grain products
- damage is done by the larva and the adult

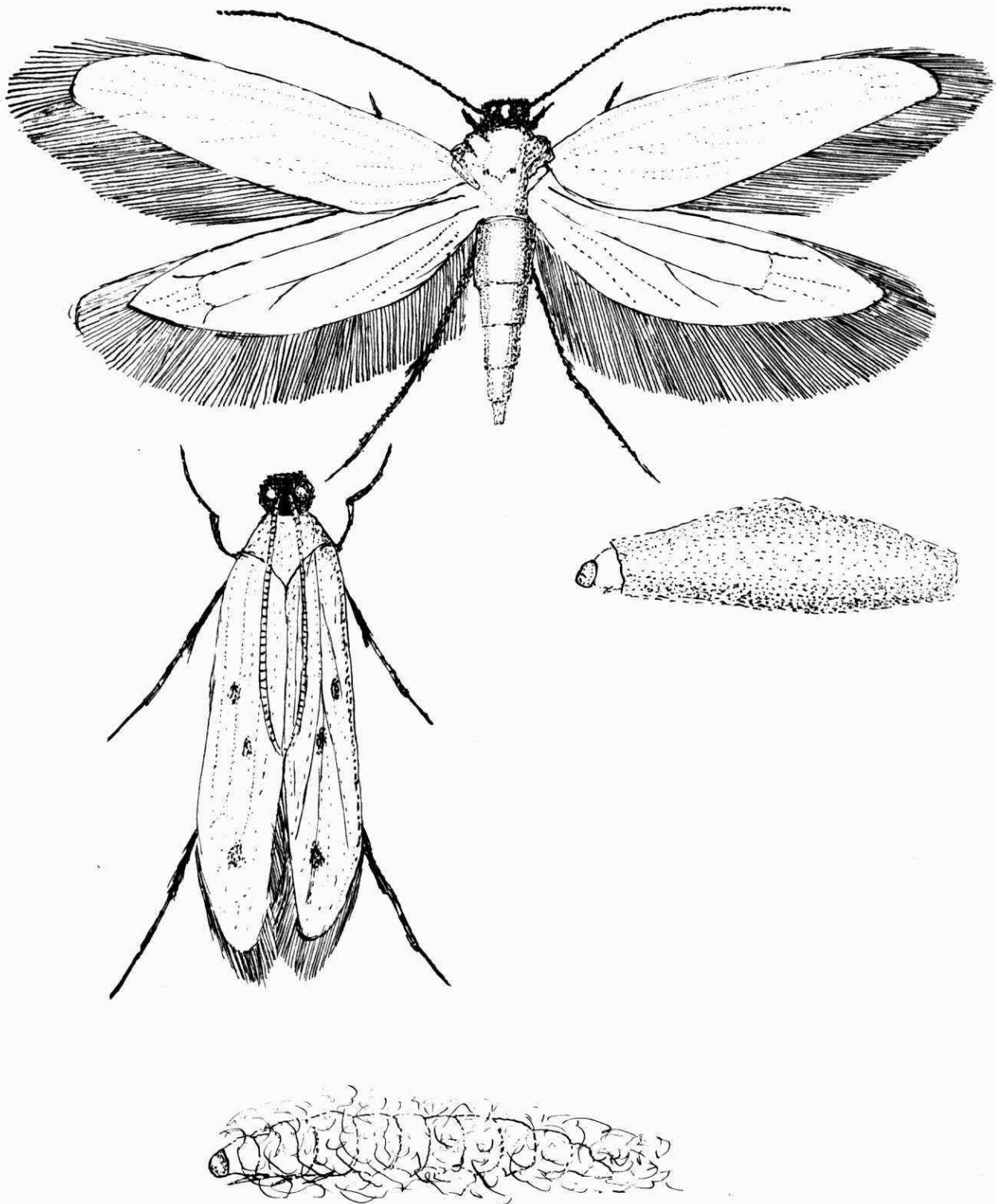


PLATE 47

CASEMAKING CLOTHES MOTH

WEBBING CLOTHES MOTH

CASEBEARING CLOTHES MOTH
Tinea pellionella

Common Name: casebearing clothes moth, casemaking clothes moth

Size: Adult, 10 to 14 mm wing expanse

Appearance: - upper side of forewings are pale shining
buff or brown colour with 3 faint dark spots
- slight dusting of dark scales

Life Cycle: - metamorphosis complete
- larva is brown headed
- larva spins a case of silk and interweaving
- larva carries this case around with it

Habits: - attacks feather filled upholstery and
cushions, woollens, rugs and furs
- damage is done by the larva

WEBBING CLOTHES MOTH
Tineola bisselliella

Common Name: webbing clothes moth

Size: Adult, $\frac{1}{2}$ inch wing span
Larva, 1 mm long

Appearance: - adult, body covered with shiny gold scales
- head has a pompadour of reddish golden hairs
- black compound eyes
- no spots on wings
- antennae darker than body

Life Cycle: - metamorphosis complete
- female lays an average of 40 to 50 eggs
- eggs are laid on threads of cloth and adhere to it
- eggs hatch in 4 to 10 days
- larva can grow to $\frac{1}{2}$ inch
- larval stage 30 to 40 days
- pupal stage may be 8 to 10 days
- life cycle 6 months or over a year

Habits: - attacks a wide variety of cloths and fur
- damage is done by the larva

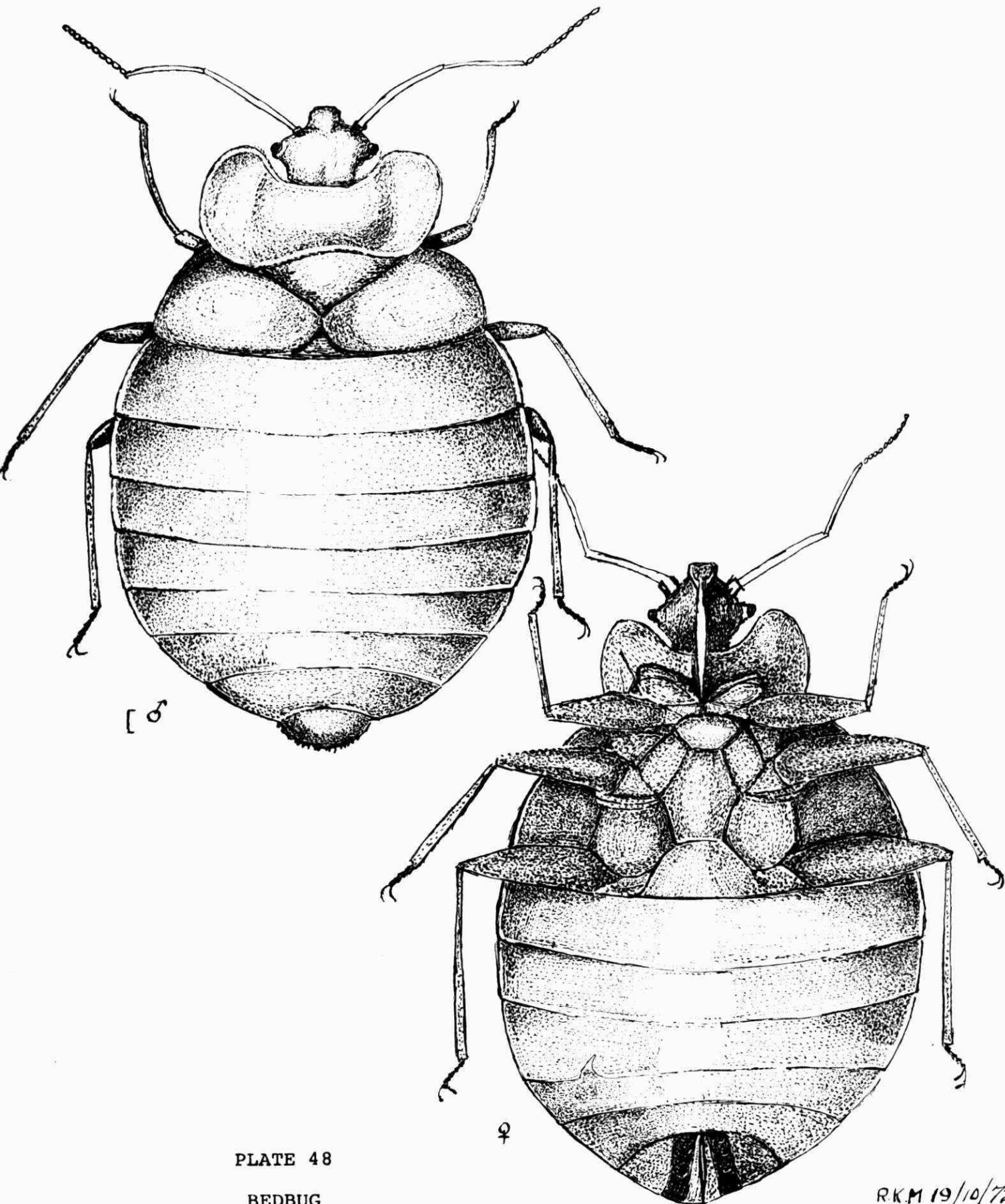


PLATE 48

BEDBUG

RKM 19/10/72

BED BUG
Cimex lectularius

Common Names: bed bug, mahogany flat, red coat, wall louse

Size: Adult, 4 to 5 mm long
 Egg, .8 to 1.3 mm long
 .4 to .6 mm wide

Appearance: - Adult, reddish brown
 - oval flattened shape
 - turns blood coloured after feeding
 - four-segmented antennae
 - beak like mouth with 2 pair of stylets
 for biting
 - outer pair of stylets similar to mandibles
 with barbs used for sawing action
 - inner pair similar to maxillae with two tubes
 - one tube for sucking blood, one tube for
 injecting saliva

Life Cycle: - metamorphosis incomplete
 - female lays eggs in cracks and crevices
 - female lays about 345 eggs
 - eggs hatch in 5 to 48 days
 - 5 nymphal stages are all like adult
 - each nymphal stage requires 1 blood meal
 - life cycle 34 to 237 days

Habits: - found in overcrowded dirty rooms, dark places
 and crevices
 - searches out host at night and bites

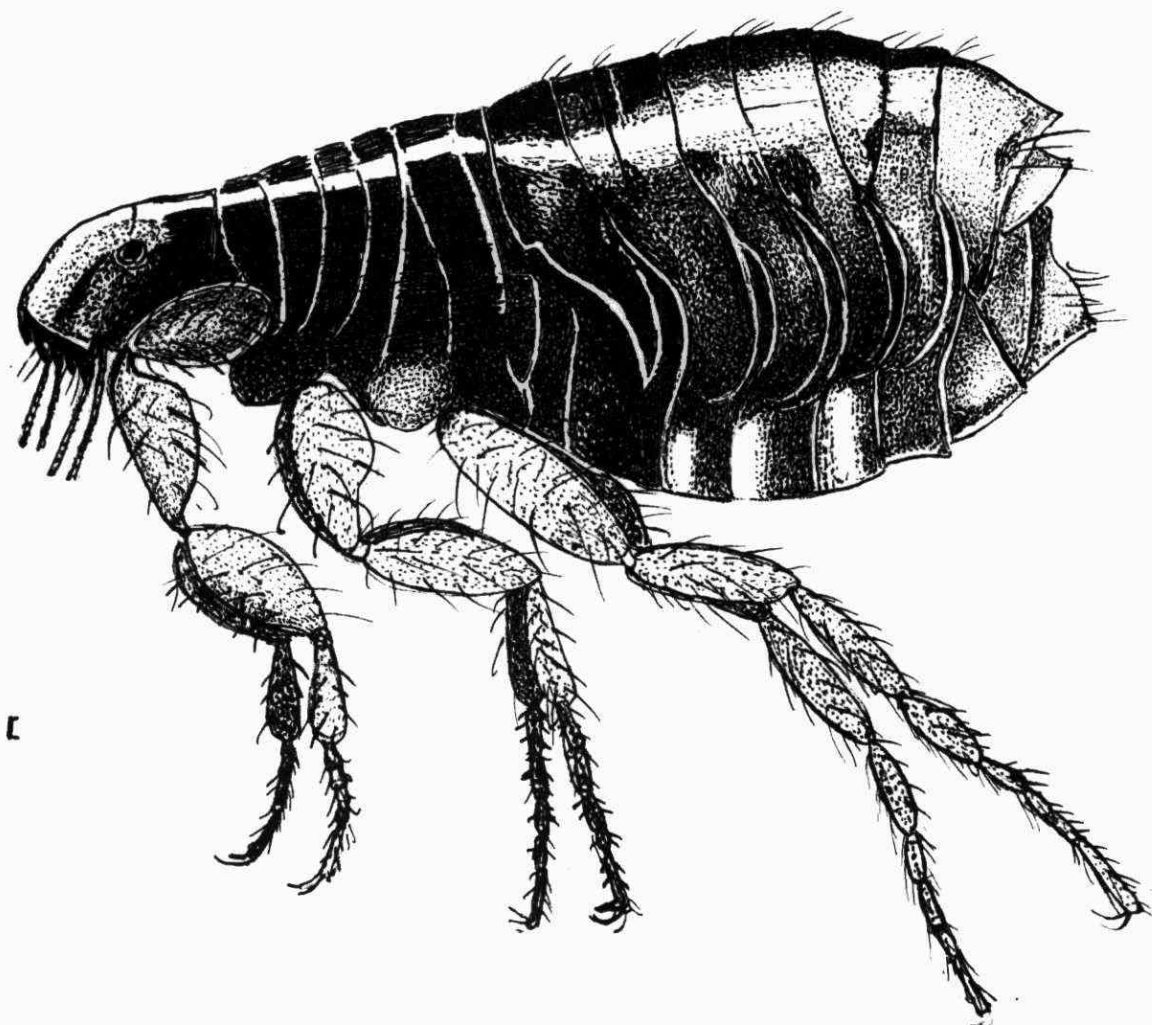


PLATE 49

CAT FLEA

RKM. 23/10/72

CAT FLEA
Ctenocephalides felis

Common Name: cat flea

Size: Adult, 1/10 inch
Larva, small

Appearance: - adult, brownish
- 8 spines on general comb
- 16 spines on pronotal comb
- 7 to 10 bristles on inner side of hind femur
- male and female are both bloodsuckers
- head is twice as long as high
- legs are strong and adapted for jumping
- larva, white and legless
- pupa, creamy white then turns brownish

Life Cycle: - metamorphosis complete
- eggs are laid in feathers, fur, clothing or sleeping place of the host
- 4 to 8 eggs are laid after each blood meal
- several hundred eggs may be laid
- eggs hatch in about 1 week
- larva has 3 instars
- life cycle about 1 month

Habits: - found in homes and lawns in summer months
- will bite cats, dogs and humans

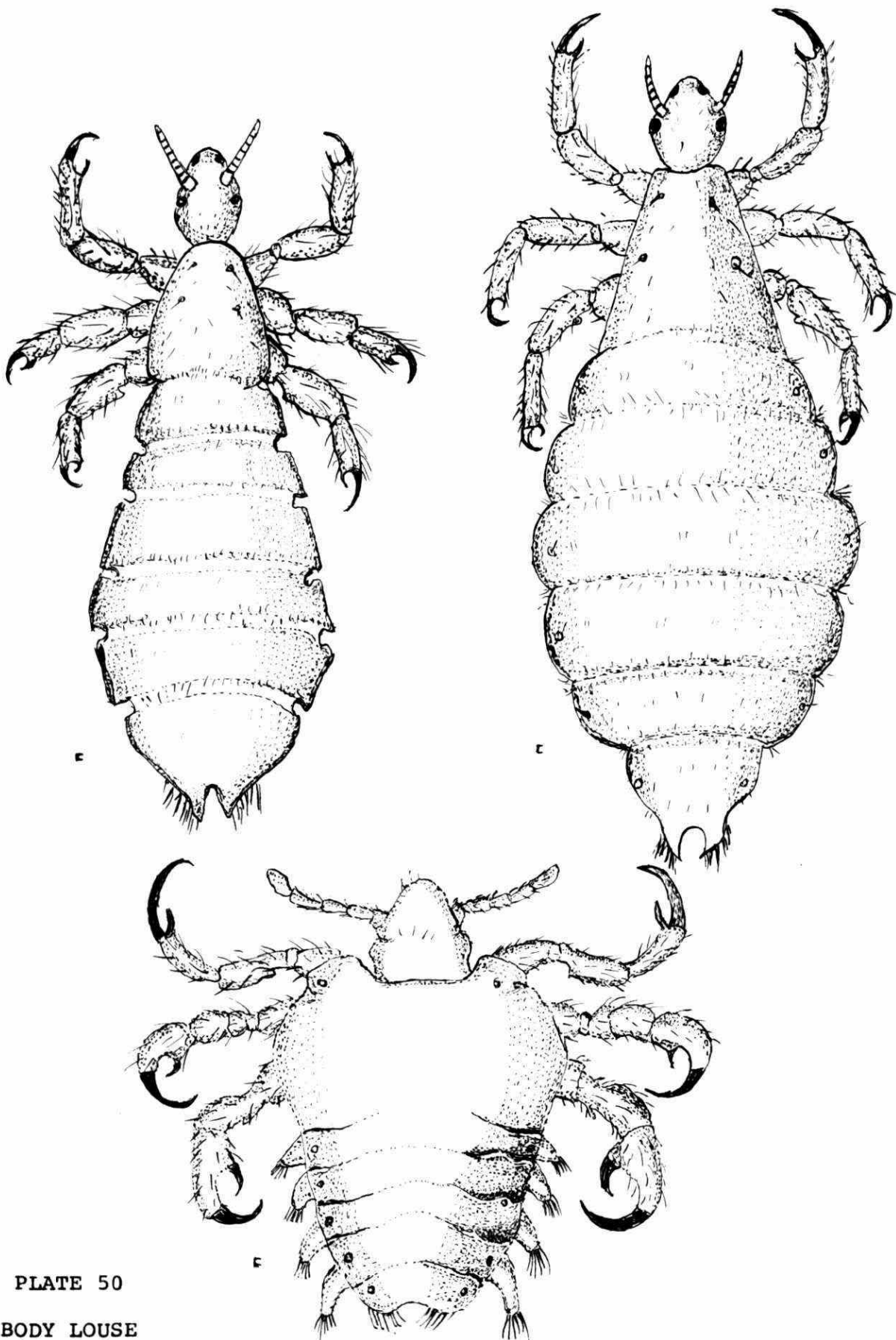


PLATE 50

BODY LOUSE

HEAD LOUSE

CRAB LOUSE

HEAD LOUSE

Pediculus humanus var capitus

Common Name: head louse

Appearance: - adult, dirty white to greyish black
 - colour depends on hair colour of host

Life Cycle: - metamorphosis incomplete
 - eggs or nits are laid on the hair near the scalp and are firmly cemented to the hair
 - the 3 nymphal stages all resemble the adult
 - nymphs and adult are bloodsuckers
 - life cycle 18 days

Habits: - found in the head hair
 - they will bite

BODY LOUSE

Pediculus humanus lumanus

Common Names: body louse, cootie

Size: Adult, 1/16 inch long

Appearance: - similar to head louse except it is
 10 to 20 percent larger

Life Cycle: - metamorphosis incomplete
 - similar to head louse except eggs are glued to fibres of clothing

Habits: - bite host when sleeping
 - occur when body and clothing are not clean

CRAB LOUSE

Phthirus pubis

Common Names: crab louse, pubic louse

Appearance: - body is broader than long
 - mid and hind legs have strong thick claws
 - forelegs have long fine claws

Life Cycle: - metamorphosis incomplete
 - egg is smaller than *Pediculus* and glued to body hair with more cement
 - egg hatches in 7 to 8 days
 - louse takes several hours to complete each blood meal

Habits: - found on pubic and peri-anal hairs, occasionally on eyebrows and eyelashes
 - they bite

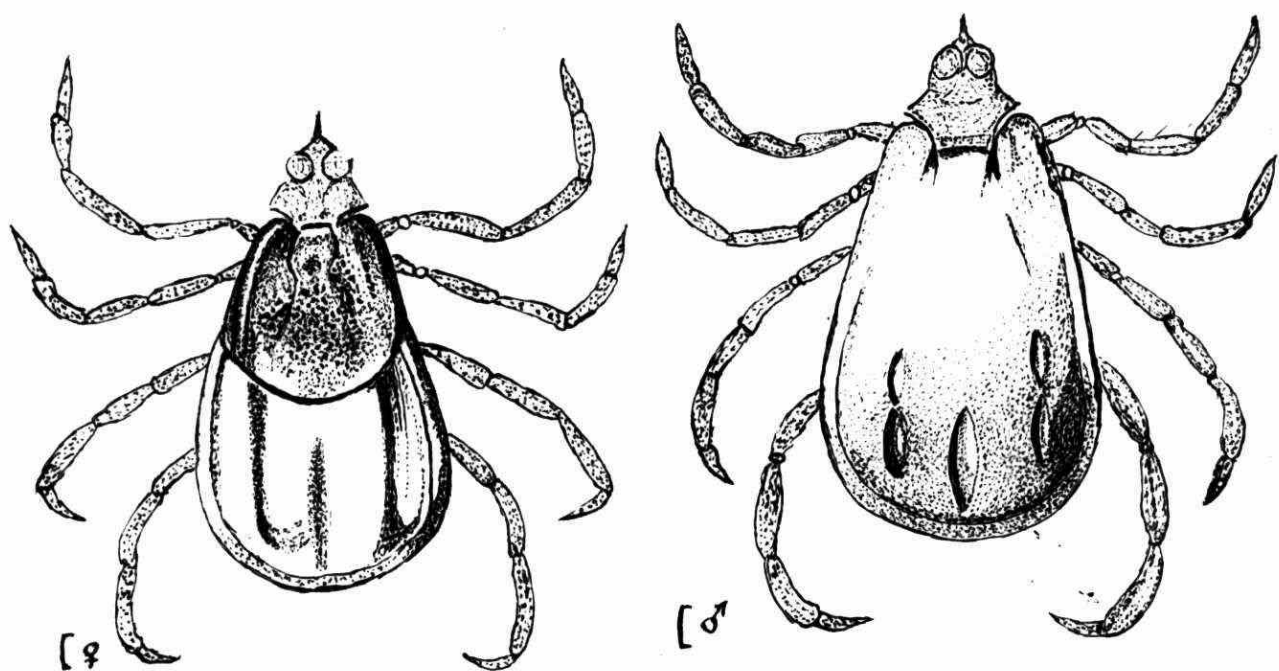


PLATE 51
BROWN DOG TICK

R.K.M. 23/9/72

BROWN DOG TICK
Rhipicephalus sanguineus

Common Name: brown dog tick

Size: Adult, 1/3 inch long

Appearance: - adult, reddish brown colour
- nymphs and adults are bloodsuckers

Life Cycle: - metamorphosis incomplete
- 100 to 300 eggs are laid in cracks and crevices
- eggs hatch in 19 to 60 days
- eggs hatch into minute active 6 legged ticks
- ticks attach to dog and fill with blood
- ticks moult in 6 to 23 days and become 8 legged reddish brown nymphs
- attack dog again and feed for 4 to 9 days
- leave dog again and moult in 12 to 29 days

Habits: - particular pest of dogs
- sucks the blood of the dog and reduces its vitality and makes it irritable
- will invade clothing and bite humans

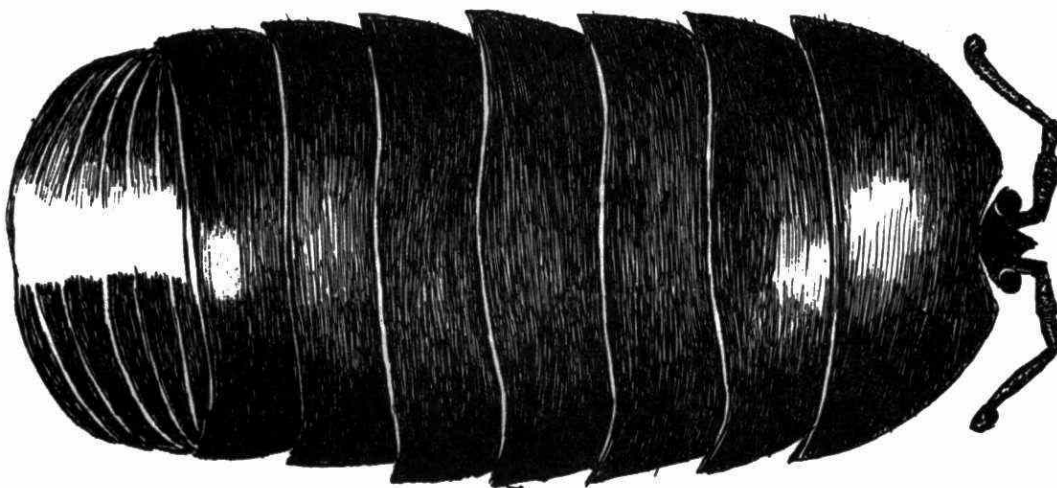
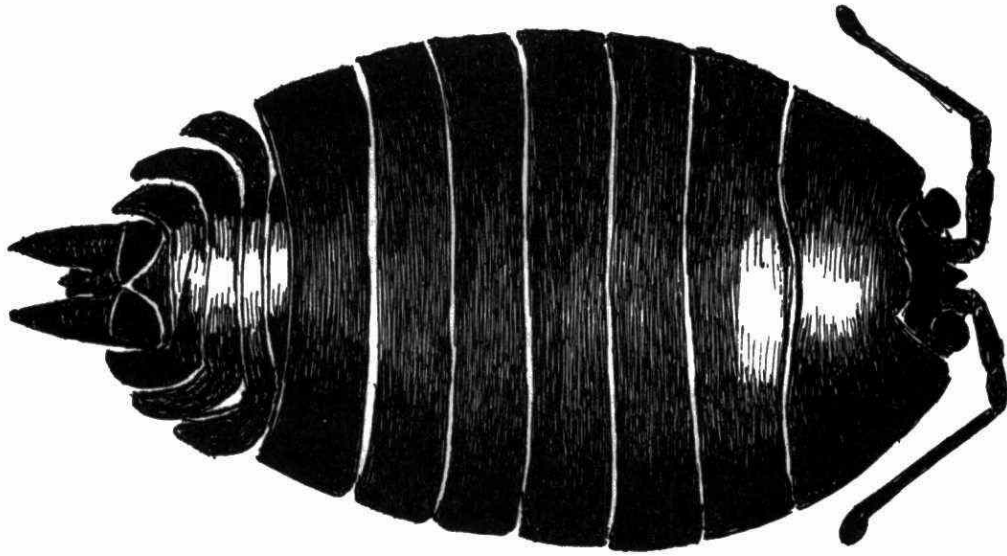


PLATE 52

SOWBUG

PILLBUG

R.K.M. 25/10/72

SOWBUGS
Porcellio leavis

Common Name: sowbugs

Size: Adult, ½ inch long

Appearance: - adult, brownish or greyish
 - has two tail-like appendages
 - oval and slightly elongate
 - body segments appear as armored plates
 - 7 pairs of legs

Life Cycle: - metamorphosis incomplete
 - female bears white living young
 once or twice a year
 - inactive in winter
 - after 4th instar, moults occur every
 2 weeks until animal is 20 weeks old
 - life cycle may be 2 years

Habits: - dwell in damp basement areas or under soil
 or in plants immediately outside house
 - feed on decaying vegetable matter

PILLBUGS
Armadillidium vulgare

Common Name: pillbugs

Size: Adult, ½ inch long

Appearance: - similar to sowbug, but lacks 2 tail like appendages
 - can roll into a ball where sowbug cannot

Life Cycle: - same as sowbug

Habits: - same as sowbug

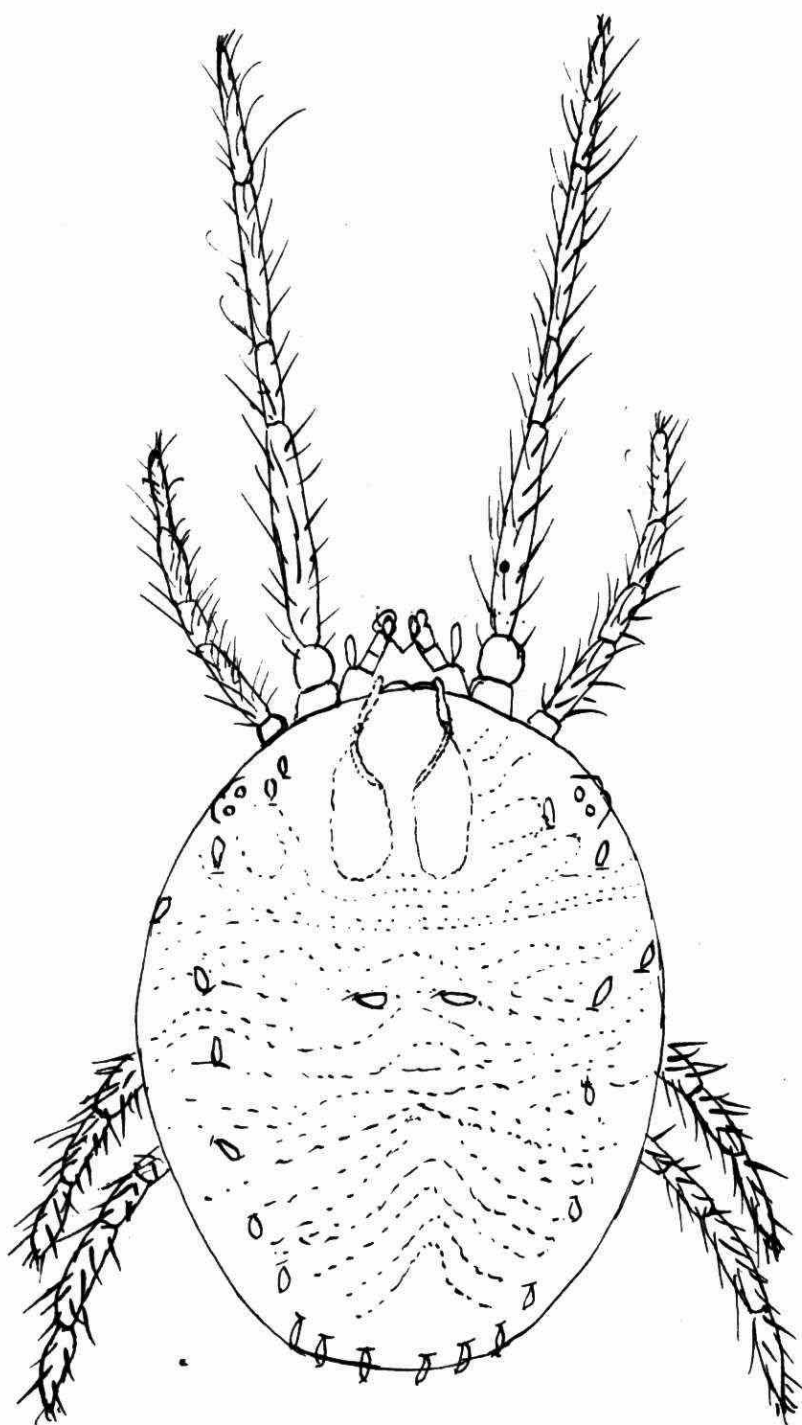


PLATE 53
CLOVERMITE

R.K.M. 24/10/72

CLOVER MITE
Bryobia praetiosa

Common Names: clover mite, brown mite

Size: Adult, .75 mm long

Appearance: - brownish or reddish in colour
- oval in shape
- long front legs
- feather-like plates on body

Life Cycle: - metamorphosis incomplete

Habits; - normally outdoors, but in spring or fall
females will migrate into the home
- do not do any damage but are a nuisance as they
migrate into the home in great numbers
on south and/or west side only
- will leave a reddish stain when smashed

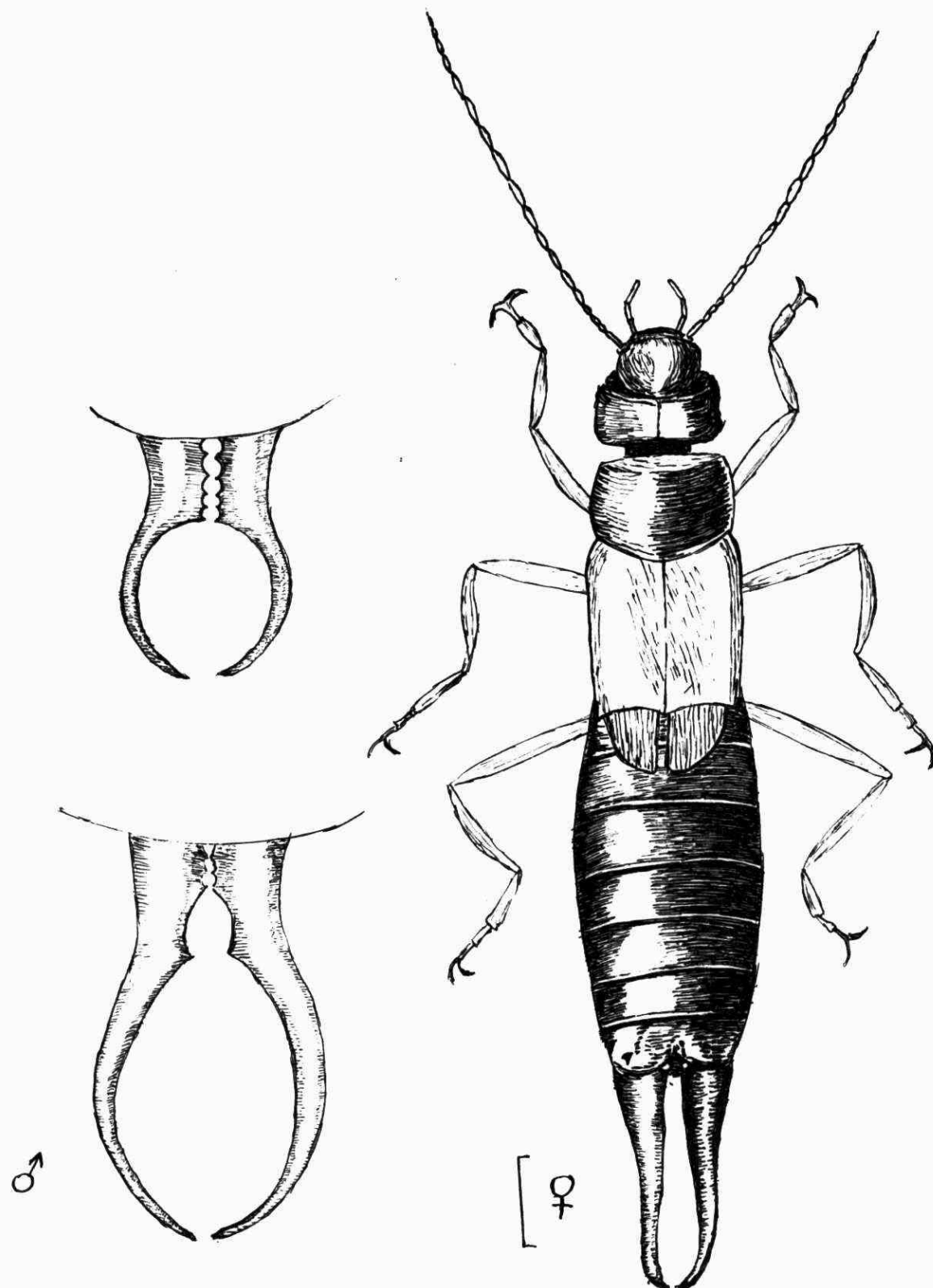


PLATE 54
EUROPEAN EARWIG

EUROPEAN EARWIG
Forficula auricularia

Common Name: european earwig

Size: Adult, 5/8 inch long

Nymph has 4 instars, increasing in size with each moult

Appearance; - dark reddish brown, red head and yellow legs
 - forceps at end of abdomen
 - female forceps are fairly straight sided
 - male forceps are rounded and caliperlike
 - have a foul odour

Life Cycle: - metamorphosis incomplete
 - in spring, female lays a batch of about 30 eggs
 - female puts eggs in a nest in the soil
 - female guards the eggs until first moult
 - incubation period about 20 days
 - nymphal stage lasts about 68 days
 = life cycle about 1 year

Habits: - found in dark moist crevices
 - feed on a variety of plants
 - ships cargos are often infested
 - earwig's bite is not serious but uncomfortable
 - also feed on other insects
 - will soon be common in all of Southern Ontario

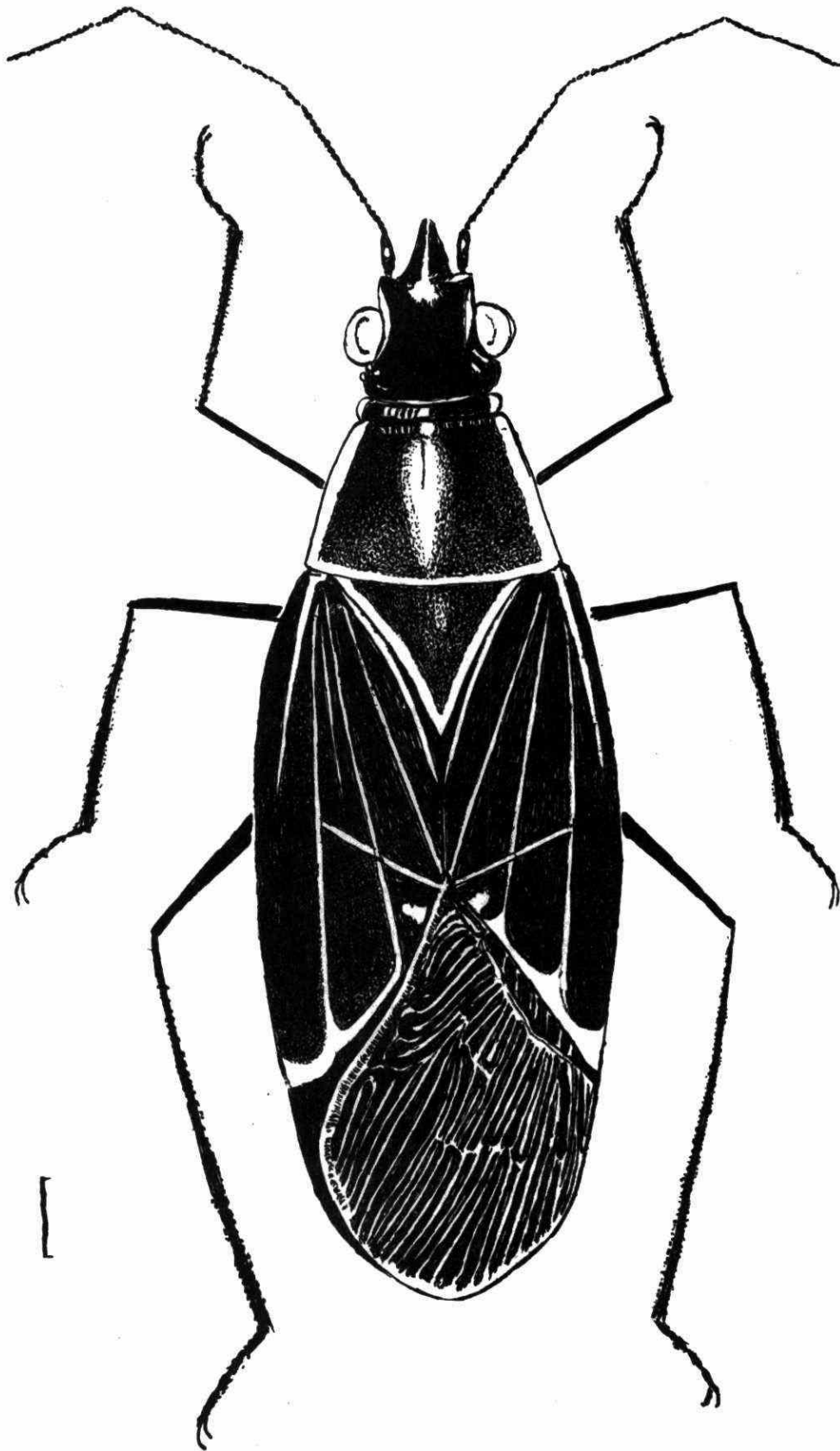


PLATE 55
BOXELDER BUG

R.K.M. 26/10/72

BOXELDER BUG
Leptocoris trivittatus

Common Name: boxelder bug

Size: Adult, ½ inch long

Appearance: - adult, brownish black
- 3 red stripes on thorax
- red veins on wings
- nymphs are bright red

Life Cycle: - metamorphosis incomplete
- eggs are laid on leaves and bark of boxelder tree
- eggs hatch when young leaves appear in spring

Habits: -particular pest of boxelder trees
- will also occur on maple, ash, and young fruit
of apples, grapes and plums
- does not do any damage but is a great
nuisance when it enters the house
- rarely develops on anything but the pistillate
(female) boxelder

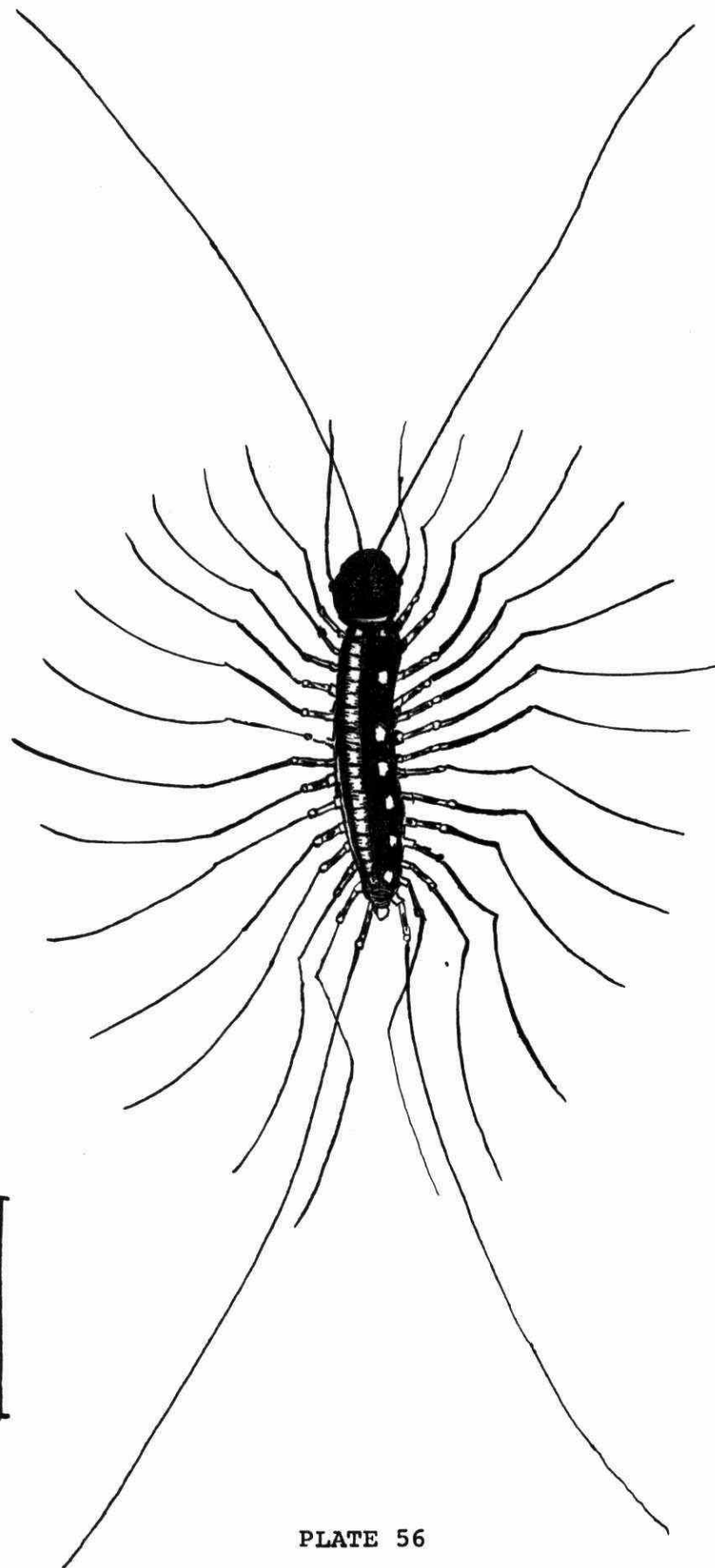


PLATE 56
CENTIPEDE

R.K.M. 26/10/72

CENTIPEDE
Scutigera coleoptrata

Common Name: house centipede

Size: Adult, 1 to 1½ inches long

Appearance: - greyish yellow colour
- wormlike body
- 15 pairs of legs
- 1 pair of long antenna from head
- back has three longitudinal dark stripes
- alternating dark and white bands encircle legs
- last pair of legs designed to lasso victims

Life Cycle: - metamorphosis incomplete
- 6 larval instars
- 4 post larval instars

Habits: - outdoors found in dark damp places
- indoors found in damp basements, closets, bathrooms

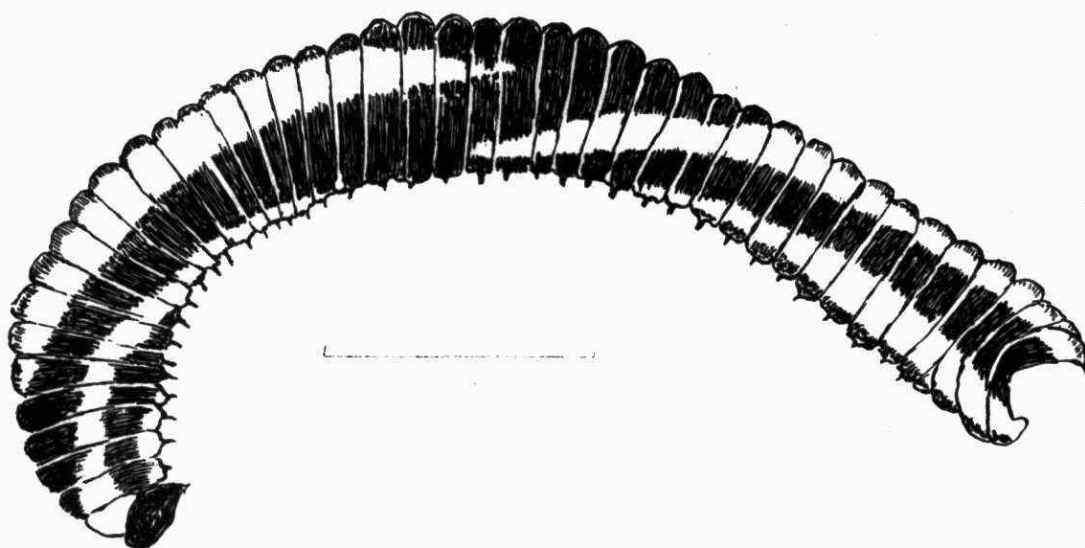


PLATE 57
MILLIPEDE

R.K.M. 30/10/72

MILLIPEDES
Phylum Arthropoda

Common Name: millipedes

Size: Adult, 1.5 inches long

Appearance: - adult, brownish
- cylindrical slightly flattened body
- first three segments have one pair of legs
- all other segments have two pairs of legs
- has an unpleasant odour

Life Cycle: - metamorphosis incomplete
- eggs are laid in clusters in the soil
- larva has 7 to 8 instars
- larval stage can be 4 to 5 years
- life cycle may be several years

Habits: - normally dwells outdoors under various objects
in damp soil
- at times will invade basements and first floor
rooms of the house

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